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"I cannot help plead to my countrymen, at every opportunity, to cherish all that is manly and noble in the military profession, because Peace is enervating and no man is wise enough to foretell when soldiers may be in demand again."—SHERMAN.

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THE NECESSITY OF A WELL ORGANIZED AND TRAINED INFANTRY AT THE OUTBREAK OF WAR, AND THE BEST MEANS TO BE ADOPTED BY THE UNITED STATES FOR OBTAINING SUCH A FORCE.

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There is a rank due the United States among Nations which will be withheld, if not absolutely lost by a reputation for weakness. If we desire peace, one of the most powerful instruments in our rising prosperity, it must be known that we are at all times ready for war.—GEORGE WASHINGTON.

However pacific the general policy of a nation may be it ought never to be without an adequate stock of military knowledge for emergencies.

—GEORGE WASHINGTON.

TO maintain a large standing army has always been contrary to the settled policy of our nation, which has created armies when the necessity for them has arisen. And yet all history teaches that permanent military establishments can be safely dispensed with only at the dawn of that far-off day when "Nation shall not lift up sword against nation, neither shall they learn war any more." So long as the passions of men remain the same, wars will be waged. Years without war may soothe some minds into a kindly belief in universal

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peace ; a growing faith in that phantom Arbitration ; the resolutions of Peace Congresses. Our traditional policy of non-interference and our position with the ocean between us and any European foe, may easily lull our nation into a neglect of war-like preparation, and the decadence of our military spirit. Material prosperity ; devotion to the arts and industries of a long peace ; conquests in the world of commerce and invention have perhaps blinded our eyes to our duty and destiny on the Western Continent. Surely the United States is fated to some day overshadow and dominate all other states on this hemisphere. The instinct of conquest is in the Anglo-Saxon blood and long before our population is as dense and the ownership of arable land, as difficult of attainment as in the best part of Europe to-day, our people will clamor for the extension of our borders, and the Latin-American with his indolence and improvidence will give way before the energetic and resourceful Anglo-Saxon American. The Monroe Doctrine has become a tenet of the National Creed, and at no distant day the possession of Cuba and the adjacent isles will be essential to the protection of our interests in the canal across the Isthmus. The very possession of over 17,000 miles of frontier (not including Alaska) is a menace to permanent peace. Even without facing one of these contingencies, each of which might mean war, there is no better index to the future than the history of the past. From first to last over a million men have given up life or limb for the flag. Since Waterloo no other nation has had as much war as the United States. Every generation since our Independence has had its war. More lives were offered up on the bloody fields of our Civil War than have been lost in British battles since Harold died at Hastings. Over ten per cent. of the past ninety-six years has seen us at war. Nor does this include that anomaly of war in peace, Indian trouble, in which, for example, from 1866 to 1891 inclusive, 874 engagements were fought with Indians. The sieges and battles of the United States are counted by scores and its minor combats by thousands.

"Military virtue is not the growth of a day, nor is there any nation so rich and populous, that despising it can rest secure." A similarity marks the beginning of all wars in which the United States has engaged. At the outset of the War of 1812,

many posts for want of orders or timely reinforcements fell into hostile hands. A generation later, in 1846, the country was even less prepared for hostilities. When General Taylor was ordered to the southern frontier in the autumn of 1845, the army was numerically less than it had been since 1808. In 1861 the country was as unready for conflict as a treasonable administration of the War Department could render it. Could President Lincoln have put forty thousand trained soldiers into the field at once, the incipient rebellion would have been crushed promptly and sufficient money and property have been saved to pay the expenses of an army of 50,000 men for three centuries, not to speak of the thousands of devoted lives that would have been preserved to the Republic. For many a year the idea has prevailed that the country is full of trained men. And so it was. Until recently the majority of the officers in our regular army had received during the Civil War practical experience in campaigning and fighting that would have proved invaluable had another war occurred during the prime and vigor of their manhood. But a proclamation will no longer bring trained and disciplined armies into the field. Over thirty years have passed. Only 20 per cent. of our present line officers saw service then. The youngest infantry officer with any war record is forty-six years old and his enlistment was after Lee surrendered. All the grades above captain are of these men. And many officers who entered the service after the war are older than some who fought in it. There are but ten infantry officers who saw war service who are under fifty years of age. And in civil life the veterans who yearly clamor at re-unions for the glory of having been the youngest soldier of the Grand Army are grey-haired men. The reserve of men trained in the Civil War which for years relieved us of the necessity of making special preparation for war, is well-nigh gone. The chief military strength of every nation lies in its citizens between twenty and thirty years old. A generation born since our last war must fight the next one. The great mass of those upon whom the country depends to-day is as untrained as the raw troops that fought the first battles of the Rebellion. Knowledge of the military art, like that of any other, is lost *through disuse.*

The United States is rich in brains, mechanical industries

and inventive genius and her citizens are unexcelled in earnestness, enthusiasm, energy, courage, intelligence, and patriotism. There is inbred in them that quality of the Anglo Saxon transmitted through generations of free self-governing ancestry, which has made that race always a conqueror. For this combination when properly trained and directed there are limitless possibilities. But untrained patriotism and intelligence and misguided energy and enthusiasm are not only powerless to save the nation in the hour of danger but through the re-action following defeat may intensify disaster. It is as fallacious and dangerous to rely wholly upon the courage, devotion and resources of the people without practical preparation as it is futile to depend upon isolated position, or arbitration, to forever protect us from war. Bull Run, Ball's Bluff, Big Bethel and a dozen other defeats tell that lack of preparation means disgrace and disaster. Nor is this lesson peculiar to our own history. "The plainest lessons of the Franco-German and China-Japanese wars are that patriotism and numbers are as nothing unless the patriotism has beforehand prepared the numbers for the emergency." The first principle of self-preservation in our day demands that we should be ready to meet sudden attacks, for in this age of electricity and steam the declaration of war and the mobilization of armies and fleets are ordered together. Our raw troops will probably never again be called upon to face equally untrained men as was the case in 1861. The armies and fleets of even second-rate foreign powers are better prepared for war to-day in numbers, command, discipline and facilities for mobilization, than ever before. Should the next time our troops face fire be in meeting one of these, the period we should have for preparation would be the time required to cross the intervening space, for war declared to-day, they could march to-morrow.*

The theory of preparing when dangers threaten is no longer a tenable one and even in the old days when it was possible, armies so raised always lacked the instruction and discipline that can only be acquired by untiring drill and study, and time for the formation of the military habit. To emphasize the wisdom of preparing for war, in organization and training savors of proving an axiom. Surely prudence demands practical pre-

* See Appendix A.

paration in every line consistent with the genius of our peculiar institutions.

Since the Swiss infantry triumphed over the Burgundian Chivalry at Granson, Morat and Nancy, when first the superiority of good infantry over the best cavalry of those days, was shown, the infantry has maintained its place as the solid mainstay and backbone of all armies. In the earliest German and Frank armies the principal arm was infantry acting with cavalry; afterwards degenerating into mere attendants of the latter. These Swiss victories restored the infantry to its ancient place and it has not since lost it. Naturally, for us, preparation for war means largely preparation in infantry, not only as most important, but as better within our capabilities in the direction of rapid and cheap training. Any war maintained by volunteers, militia, or a general levy inevitably bring into the field a numerous infantry. It can be made ready for war more cheaply and quickly than any other arm, and, strength in infantry combined with skill in command may in a measure compensate for a lack in the other two arms. The Germans, confessedly, till the next war at least, the foremost military nation, say an infantry soldier can be prepared for defensive war in one and for offensive war in two years. Such time is not at all adequate for the making of the cavalry or artillery. Because of this greater comparative quickness in preparation the peace establishment of infantry is by common usage kept proportionately lower than the other arms. Its very susceptibility for quick efficiency results to its own disadvantage in that respect. Again, the general stock of military knowledge existing among civilians is more readily utilized in infantry than other branches. The infantry composes the mass of all armies and the action of other arms must be subordinated to it. With its fire more decisive and deadly than that of artillery, it is the army when drawn up before the enemy; fighting by infantry seems in order almost any time within range, and always some time during the battle, while the opportunity to employ cavalry may not come. Its action is prolonged under exposure while the cavalry charge is over in a moment. It is aptly said that while cavalry are counted by horses and artillery by guns, in infantry the human alone is taken into account, and as more responsive to training and to

personal influences its nature opens up greater possibilities both in training and use than other arms. Perhaps the case for the infantry has been by no one more aptly and concisely presented than by Major Wagner in his "Organization and Tactics": "Both numerically and in the effects of its action the infantry is the most important part of an army. It can operate on all kind of ground; it is equally adapted to offensive or defensive action and it can act either at a halt or in motion. It is more easily equipped, more cheaply maintained, more quickly made efficient and is more nearly independent than any other arm. The efficiency of an army is mainly measured by the efficiency of its infantry, and the Austro-Prussian War of 1866 showed that the deficiency of infantry cannot be counterbalanced by the skill and daring of the cavalry or the devoted heroism of the artillery." General Sherman once said before a committee of Congress that he looked upon two infantry regiments as worth more than the whole general staff of our army, himself included, and that he would rather have Congress abolish him and his office and tear out the first thirty-eight pages of the Army Register than see it disband two such regiments. "The infantryman equipped with the musket and bayonet constitutes the most formidable machine of combat that man can imagine" and "on the battle-field as infantry gains or yields ground it irresistibly draws the other arms with it in advance or retreat." Armies of to-day are much on a par with regard to arms, equipments and munitions of war. So too among civilized nations the same wars serve as lessons for the military student; the same general ideas as to leadership, strategy and tactics, prevail the world over. The victory then in future struggles will follow organization and training unless out-numbered. On the latter score we have nothing to fear. Every other nation of any importance has kept its organization to date with the improvement in weapons. Our country has marked time for half a century in such matters, and to-day maintains an infantry organization, born in the age of flint locks, which would go down in the first engagement with a civilized enemy. Everything seems to demand that our organization be suited to the employment of our excellent arm, that we may apply modern methods to modern appliances. "A solid organization and an equipment with the very best of arms, are

the indispensable foundation of tactical success on the battle-field." No mightier intellect than John C. Calhoun has ever ruled in the War Department, and his words written seventy-two years ago are as weighty in wisdom for his countrymen as though the great southerner spoke to-day: "It is only thus that we can be in the condition to meet the first shock of hostilities with unyielding firmness, and to press on an enemy while our resources are yet unexhausted. * * * Without such troops the two or three first campaigns would be worse than lost. The honor of our arms would be tarnished and the resources of the country uselessly lavished, for in proportion to the want of efficiency and a proper organization, must in actual service be our expenditures. When taught by sad experience we would be compelled to make redoubled efforts, with exhausted means, to regain those very advantages which were lost for the want of experience and skill."

Granted that a well organized and trained infantry is a necessity at the outbreak of war, it is believed that in the future as in the past our dependence must be on the regular army and volunteers, as such, for: (1) The United States are never likely to maintain sufficient regular army for war needs. (2) Both the Constitution and the jealousy of States stand as a barrier to the militia ever being nationalized up to a standard and organization cohesive enough to meet real war, except when actually mustered into the National Army as volunteers. It is thought, then, that the best means for the United States to obtain a well organized and trained infantry will be found: (1) In such legislation as will give the regular infantry a modern organization and provide for its immediate expansion at the outbreak of war, and such training in peace as will make it a model of efficiency. (2) In such legislation and aid to the militia as will remedy its present defects, and make it as nearly as possible uniform in organization and training with the regular service, that when its organizations are mustered into the National Army it will be as volunteers already trained. (3) In some combination of regulars and militia in systematic instruction.

THE REGULAR INFANTRY ORGANIZATION.

One of the fundamental principles of organization is to have

the military grouped during peace in the same manner as in time of war.—Derrecagaix.

In organization and administration it is indispensable that the first place be given to the system and method that will make the army most efficient as a body of fighting men, that the essential functions of supply, equipment and administration that require the commercial virtues, honesty and industry but not great military capacity, take their proper place as subordinate members, not usurp those of the directing head of the body, the army; that the ability to organize, care for, discipline, command and fight troops be sought for, cultivated and rewarded.—General Miles in 1876.

Experience has shown that a regiment of ten companies in a single battalion cannot be handled effectively.—General McClellan.

The ten company organization is awkward in practice and I am satisfied the infantry regiment should have the same identical organization as exists for the cavalry and artillery, viz.: 12 companies so as to be susceptible of division into three battalions of four companies each. * * * Three such regiments would compose a brigade, three brigades a division, and three divisions a corps.—General Sherman's Memoirs.

As before stated the regular army of the United States will never be a large one, but it is the repository of the military usages, and the guardian of the soldierly traditions of our nation. It is to preserve and keep pace with the constant changes in the art of war, and it is the great fountain from which our militia—sometime volunteers—are to draw the knowledge, skill and *morale* which at the time of the country's peril will make them its saviours. In organization it should be a type and in efficiency a model. The organization must be in harmony with the spirit of our institutions, justified by our own history, and suited to the changes time has wrought in arms and projectiles, not forgetting that much of the best in the modern science of war has been evolved from American experience. The best organization for our infantry on a peace establishment, having always possible war in view, would be that in which the enlisted strength was the minimum indispensable for peace duty and the development of its efficiency, with such a

proportion of officers as would be required at the outbreak of war for the augmented and war strength of companies and regiments. A basic principle should be that "at the commencement of hostilities there should be nothing in organization to either new model or create" (Calhoun); the difference between the war and peace formation being only in the greater size of the former, and the transition from peace to war being only an augmentation for the latter state. It is thought, then, primarily, that an expensive system of organization for the infantry is imperative to the interests of the country. Active companies should be maintained on a peace footing to be a large fraction of their war strength, and the number of regiments to be such that in general perhaps only two-thirds of the companies and battalions should be organized, except in commissioned strength. Any ordinary emergency might then be met by simply filling up skeleton companies, and raising the strength of others, uniting recruits in sub-organizations with disciplined soldiers, the skill and discipline previously acquired by the older soldiers being readily imparted to the younger.

The question that presents itself when the size of the army is mentioned, or changes in it suggested, is the one, which properly enough seems always to the fore in the American legislator's brain—that is, cost. It is believed that the numbers of the army should bear a constant ratio to our ever-increasing population; that if of the proper size twenty years ago, it is too small now; and its strength should be measured by the limit which Congress judges the people able and willing to pay in the way of insurance by military proficiency and preparation, against heavy loss in case of war.

Organization is tactical and administrative, the one relating to fighting, the other to the maintenance of the soldier in peace and war. The units are companies, battalions, regiments, etc. The best unit is one that combines both tactical and administrative uses. The field of battle being the great final object of all things military, when tactical and administrative considerations conflict, the latter must give way. Organization for the field should depend: (1) on the range and penetration of projectiles, and the accuracy and rapidity of fire as determining the

maximum size of the body which can appear as a unit on the field of battle without annihilation or ruinous losses. (2) On the range of the human voice and eye as further determining the maximum limit of the unit which one man can directly control in action. (3) On the relations which these considerations produce between different arms. The body thus determined should be the correct tactical unit. The number of line officers needed to command is practically the same the world over, and called by whatever name it may be, American "battalion," German "company" or British "wing," the limit to the command which can be directly handled by one leader seems placed by all experience at near four hundred men. That the best fighting unit for us is the battalion of this size is suggested by our own experience. In the Civil War regiments were handled as single batallions and the best fighting on the hottest fields was done by these regiments dwindled in numbers to about four hundred men, which is slightly greater than the average strength of Sherman's infantry regiments at the end of the war (Wagner). Strong pressure for office, and the greater ease with which new corps could be formed having forced the Government into raising troops in that manner rather than by keeping existing organizations up to strength.*

The Roman centurion was captain of a hundred men. The company—the command of a captain—is the foundation of all good armies. There the men first learn obedience and subordination; their individual drill and guard duty; how to preserve health and strength and take care of themselves; how to cook and live as soldiers. On the books of the company is found the military history of the individual, the record of the changes and progress in his soldierly career, and the data on which is founded his claim for provision in impoverished infirmity and old age. The proper command of this unit means personal contact of the commander with his men, and such knowledge of their dispositions, habits and previous occupations as will enable him to place each man's personality to the best advantage. This personal knowledge, essential to the efficiency of the company, is hardly to be had with more than one hundred men, so that the

*See Appendix B.

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natural division of a battalion strength of four hundred should seem to be four companies.

The regiment is the military family. It means home and people for the soldier. It is for his daily life while the battalion is the organization under which he faces the foe. The regiment is determined by the maximum of battalions that can be controlled as such, by one leader, fixed by general experience at three. In the regiment administrative and tactical considerations unite and it is the most perfect unit of organization found in armies. "Tactically it is a necessity for a brigadier-general can easily command three regiments where he would find the control of nine battalions a matter of difficulty."

That three infantry regiments should compose the brigade; three brigades making the division and three divisions forming the corps, in our service, seems to pass unchallenged.

SKELETON BATTALIONS.

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The great crowning argument for maintaining commissioned strength for a third more battalions than are actively organized is the provision, at trifling comparative cost, of trained leaders for the immediate addition to the infantry of one-third its war strength in case of sudden need. There is no lack of necessity for these officers in time of peace. Every one familiar with the regular army knows the ever existing scarcity of officers with troops. "Orphan" companies are not uncommon; many have but one officer with them, but an organization with its full complement is so rare as to excite comment. In June, 1896, as representative a month as any, there were on duty away from their regiments, one hundred and seventy-seven infantry officers, as follows:

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Infantry and Cavalry School	thirty-two.
College duty	sixty.
Miscellaneous	thirty-two.
With State troops	seventeen.
Recruiting	fifteen.
Military Academy	twelve.
Indian Agents	nine.

That is, the commissioned strength of eleven infantry battalions is already employed away from regiments. Nothing can

be required of the army which in the end will be more remunerative than the duty of spreading military knowledge among the people. From the foundation of our government the transmission of such knowledge has been a question of national importance. Not a little of Southern success on the earlier battle-fields of the Rebellion was due to Southern Military Academies. One hundred army officers are now on duty at schools and colleges throughout the country. In these institutions about 15,000 students are under drill; in private schools half as many more, or over twenty thousand in all. Perhaps half these men leave school yearly from various causes. Ten thousand men with more or less college education and enough military training to go to war as company officers and non-commissioned officers, go into civil pursuits each year. By satisfying the demands for additional officers for such details this number might be doubled. There can be no higher, holier duty than this preparation of the youth of the land to come to the rescue of the flag in the next hour of danger.

One of the best uses of the regular army is in details with State troops. In 1895 army officers were on duty in thirty-three States. In addition to these, twenty-five officers were detailed at the request of governors to attend State encampments. In two States retired army officers fill the position of Adjutant General. Every State and Territory ought to have an army officer regularly on duty and it is thought the service of one to each brigade or fraction thereof could be well utilized. The skeleton battalion proposed would make it possible to employ officers to this extent without crippling regiments to the injury of the active companies. Unless there is behind the army the good will of our best citizens it cannot attain its highest usefulness. In a way our army must defer to public opinion. It must please the people; it is their army. Stationed on the frontier or near the largest cities the service is unfortunate in that people know little of it. Industry, manliness and earnestness, always win friends among those whose voice is said to be the voice of God. Not alone in military lines must these qualities be found but in all proper efforts to popularize the army. The voter must be made to see, through army officers, that proper education of the soldier means time and labor. In time

of peace it is chiefly through these details to impart military instruction that our officers, drawn from all walks in life, have the opportunity to prove themselves worthy of confidence, and in sympathy with the people from whence they sprang.

PROMOTION AND RETIREMENT.

"The enforced continuance in subordinate stations cannot fail to tell even upon the best men. The tendency of such a system is to make routine men, to substitute apathy and indolence for zeal and energy. Officers who grow old in one grade and without promotion are but little encouraged to exercise their powers of volition. They come to regard themselves as part of a machine. Self-reliance, resolute action, readiness of resource and the exercise of individual judgment are trampled out by this stagnation."

The experience of all countries has demonstrated the great importance of encouraging hopes of preferment and reward in the army. The man who embraces the profession of arms gives up some of the citizen's most cherished rights and privileges. A stringent military code hampers his freedom of speech and liberty of person. His movements depend upon the will of others. These are not small sacrifices, yet the officer makes them for the interests of the land under whose flag he serves. In return he hopes for rank and command. A steady, reasonable flow of promotion is essential to the efficiency of an army. An officer must grow up to his responsibilities. The man who walks a quarter of a century in the line of file closers loses the power of rising equal to emergencies encountered later in life. It is only through the constant exercise of self-dependence that an officer becomes capable of real comand. A Royal Commission in Great Britain gave as its opinion that the fact that on an average the rank of captain was not attained till past thirty-five; major till after forty-nine, or the command of a regiment till after the officer was fifty-three, was "destructive to the efficiency of the army." The American officer is not less ambitious or deserving than officers of the same blood beyond the seas, and causes that militate against efficiency in the army of England may well alarm us for our own. Sixty-eight of our infantry field officers are past fifty-three, one hundred and twenty-seven

captains are over forty-nine, and in June 1896, two hundred and one first lieutenants were beyond thirty-five. These figures are for the present—when these officers reach the next grade how old will they be? It is believed that officers not attaining a certain grade by a determined age should be retired. Obviously many thus retired would be both physically and mentally qualified for further service and might take the place of younger officers on the active list now on duty away from their commands. The employment of a certain number of them with higher rank in the service of the National Guard might well be made a condition to the enjoyment by the several States of appropriations from Congress for the benefit of the militia. In case of war, some of these men would be found able to go to the front, and numbers of them not fit to do so, might take the place of the able-bodied at recruiting, furnishing officers for depot battalions and similar duty. The beneficial effect of younger blood in the infantry, the incentive to honorable effort that steady promotion would furnish cannot be questioned. Against it can be urged only, that the proposition for graded retirement is liable to raise up enemies for an already large retired list, whose purpose was support to the old and disabled officer. It is true that the retired list is large, but it must be remembered that it by no means represents the current deterioration of the regular establishment of to-day. Over one hundred officers are borne there by reasons of disabilities incurred *in the volunteer* service, and who "thus represent a portion of the wear and tear of those great armies whose rolls show four times as many officers as there are souls all told in our present army." Representing too not the ordinary casualties of army life, but the regular army's share of the living damage done by the war.

RECRUITMENT.

"If we adopt the three battalion organization in peace we shall have to abandon it in time of war unless in connection with it we establish a depot and a system of recruitment which shall insure a steady supply of reserve troops." (Upton.) Speaking of our system of recruitment during the war it has been said "Instead of utilizing the army's capital of long service, thorough acquaintance of officers and soldiers, memories of

labors, dangers and suffering shared in common, of dark and bloody days of defeat manfully and patiently borne, of glorious scenes of victory rewarding steadfast valor and unremitting energy, this the greater part of the North blindly and recklessly threw away." But one State adopted the plan of keeping full its veteran regiments. All the others as additional troops were forwarded sent them as new regiments. They fell heir to no glorious history. It was not their duty to maintain the honor of an already famous name or number. Officers and soldiers learned their duties without the benefit of association with experienced men who knew them. The system was unfortunate and wholly unnecessary. The appointment of volunteer officers by governors was not by any rights in the case; it was simply permitted. These demands of politics must in future be met by confining new appointments to personal staff, casualties, etc., and in as much as possible we must spread military education so that those obviously fit for commissions will largely make the number who claim office for political reasons. A fourth and depot battalion, is in time of war an essential feature of the regiment with three active battalions. This would be officered by those invalided from the front, and from retired officers not able to go to war. Recruits before joining their regiment would receive a course of training in the depot battalion, which would be kept recruited to its maximum strength. When the regiment at the front dwindled to a certain strength, the best trained would be sent forward on requisition.

THE MILITIA.

The great mass of the people of our country are quick in their applause of every act of military valor, and faithful in fostering the military spirit. Alleged prejudices against the army and other military organizations will generally be found to be but the invention of the low demagogue. No nation is more ready than ours to render homage to the loyal soldier. None has paid more honor to its military dead. None has lifted more monuments in memory of national defenders. Our people and our military have always been friends. For a generation the returned soldier has been a most powerful political factor. His story is inseparable from the growth and glory of the nation.

The theory of our institutions is that every adult male is liable to be needed at some time as a soldier, and wise and proper laws for his enrollment should be enacted. The second amendment to the Constitution declares plainly that a well-regulated militia is necessary to the security of a free state. No opinion adverse to this has ever been voiced by any statesman who has expressed an opinion upon it. And yet the law on this subject was enacted in 1792, and practically without change still governs us, though to take its provisions seriously would make us the laughing stock of the world. Probably 99 of every 100 citizens subject to enrollment under its provisions are unknowingly violating them.

The weapons it contemplates are in museums instead of armories and are valuable as curios and antiquities, rather than for use. In imminent danger of invasion from foreign or Indian foes, the President may call forth such number of our flint-locked powder-horned and spontooned sons of Mars as may be convenient to the field of action and may be deemed necessary. No law of the United States is so generally disregarded. No recommendations of the various Presidents and Secretaries have been so uniformly unheeded as those urging remedies for defects in the militia laws. No other subject of such importance has been so unfortunate in securing appropriations from Congress. No factor is more unequivocally declared as "necessary to the security of a free state" than a well regulated militia. No other element can contribute as much to the spread of the military spirit, or of military education. No other source can supply the volunteer forces in future wars with such numbers of trained soldiers. On no other subject has the history of recent industrial disturbances taught a plainer lesson. On no other force can we depend for the all important "first line" under cover of which we may gain that time which in our next war will be the element we will need most and have the least.

Every nation maintains some form of militia as a reserve to its standing army, and the smaller the regular army, the more important it is that the militia be thoroughly organized and trained to the maximum of efficiency. Our Constitution delegates to Congress the power "to provide for organizing, arming and disciplining the militia" and reserves to the States the ap-

pointment of officers and the authority to train the militia "according to the discipline prescribed by Congress." Our militia has a duty both to the States separately and to the Federal Union. For the former it is a force for the preservation of order where the civil authorities are not equal to it or need support, and it is to enforce law: for the United States our fathers intended it to be a force trained as a reserve to the regular army, in emergencies, and a great school of instruction in which the youth of the country should receive sufficient military training to enable the militia to act as a feeder to armies raised for the nation's defense. Under the provisions referred to, and to make the militia meet these requirements, the law of 1792 was passed, and it is the law still in force. Its principal feature is the enrollment of all able-bodied citizens between 18 and 45 years of age, and the provision that they shall arm and equip themselves at their own expense. Later a permanent appropriation was made to arm and equip the militia, but the other provisions still remain in force. Either the National Guard of to-day is militia in the sense which brings them under the Constitutional provision and therefore gives them this law of 1792 as their authority for existence, and their organizations must be based upon it, or they are State standing armies and are by the Constitution prohibited. Aside from its provisions which have been rendered obsolete and ridiculous by the lapse of time, the militia law has defects which have been pointed out by every Administration from Washington to McKinley. Many of the deficiencies of the law have been supplied by the States in their encouragement of the National Guard. But the law must be reconciled to the changes time has wrought: to include beyond equivocation the volunteer guard as it exists to-day, and to remedy defects in the National Guard system which seems to have "growed" like Topsy, and which nevertheless supports the only representative we have of the militia of the Constitution. Suitable legislation must come from Congress, and the States may be trusted to pass laws necessary to utilize the appropriations, allowances, instructors, scholarships, etc., which the United States may make available. A primary defect of the old militia law is in the excess of numbers it holds to service. With our vast and constantly increasing population active militia duty from the whole body of

citizens between 18 and 45 is an unnecessary burden, and a proper division of such citizens would be into two classes,—an organized and an unorganized militia. The former to consist of troops regularly volunteering and enlisted and organized by the different States. This organized militia to be subject to call of Congress or the President as now. The unorganized militia to be exempt from military duty to the United States except when called into service by special act of Congress. Notwithstanding the general assent to the importance of the militia, the United States appropriates less for the militia than do the several States. And it is a false idea that the money appropriated for arming and equipping the militia is money given them. The United States manufactures or buys war material, which, instead of being hoarded in armories, is intrusted to the National Guard, and while some by "fair wear and tear in public service" become unserviceable, the remainder is still the property of the United States and can be utilized by it at any time as it sees fit. From 1808 to 1887 the annual appropriation was $200,000. Since 1887 it has been $400,000. One State in the Union alone appropriates $447,000 for its militia. There are in round numbers 112,000 organized militia in the country, principally infantry. The money spent by the United States on arming and equipping this force averages about $3.50 for each man, or about half enough to buy cartridges for his annual target practice. This is apportioned among the States according to the number of Senators and Representatives they have respectively. There is nothing in such distribution to furnish an incentive to raise and organize militia beyond one hundred men to each Senator and Representative. As a result the burden of supporting them is most unequally distributed among the States, some raising many more and others less than their just proportion. This same state of affairs prevailed in raising volunteers. Five States furnished three-fifths of the two and one-half millions of men who went to war between 1861 and 1865. New York, Pennsylvania and Ohio sent more soldiers to fight for the Union than all the rest of the nation combined. Ohio has more soldiers' widows and orphans than any other half-dozen States in the nation. Why should Ohio this year appropriate $133,000 for militia against West Virginia's $15,000 for the same purpose?

Or New York appropriate over $400,000 and Arkansas, Nevada, Idaho and South Dakota not a cent? Congress should authorize the President to order the organized militia into the service of the United States for instruction for thirty days each year, and the whole amount of the appropriation for the militia should be apportioned pro rata among the several States and Territories and the District of Columbia, according to the number of regularly commissioned and enlisted and organized militia appearing for muster into this instruction service. Other conditions to the benefits of the appropriation should be:

1st. The employment by the governors of the respective States of such retired regular officers as the Secretary of War may decide able and fit for such duty as officers of the National Guard with one grade higher than their retired rank. Each State commissioning its proportionate share and appropriating such sums as with the retired pay of these officers will give them the active pay of the grade held in the militia.

2d. Each State should require every separate organization on which its share of the appropriation is based to assemble for drill and instruction at least twelve times each year, exclusive of the time spent in the service of the United States.

3d. An annual inspection of each organization in the State should be made.

The appropriation for the provision of arms, ordnance, stores, signal, engineer, subsistence, medical and quartermaster stores and camp equipage, including such blank forms, regulations and service manuals as are furnished the regular army, ought to be sufficiently generous to make it an object for each State to comply with the foregoing conditions and organize its militia to obtain the pro rata. It is believed that this would lead to the military training of about the same proportion of citizens in each State and Territory. President Washington, in 1794, said: "The devising and establishing of a well-regulated militia would be a genuine source of legislative honor and a perfect title to public gratitude." The National Guard has met the "devising and establishing" phase of the problem, and any national legislator who can engineer appropriations through Congress that will foster and encourge this bulwark of our defense and security will deserve better of his country than all the "watch dogs"

of the Treasury that have flourished since the first Congress met. The organization of the militia should by Congressional enactment be uniform and expansive and in each State conform to the organization of the United States regular establishment. Ten States now have 12 companies to an infantry regiment (3 battalion organization); five have 10 companies to the regiment, and the remainder vary between 8, 9, 10, 11 and 12. The arming of the militia should be uniform. Rifles of .50 calibre are used in some States, .45 calibre in others, and at least three different makes of rifles are in use. Organization, arms, instruction, discipline and administration must be uniform throughout before our militia will reach its highest efficiency.

The elective system of officering the militia prevails in almost every State, and it is believed to be a great barrier to progress. Quite often this election proves influence and personal popularity rather than fitness and capacity, and the sooner this system is abolished the better. That it is democratic and similar to our institutions is true, but it seems wholly inconsistent, and irreconcilable to the military idea. Appointments as far as practicable should be of men who have attended military schools. It is further believed that the Constitution should be changed to reserve to the President the appointment of general officers of the militia when called into the service of the United States, limiting such appointments to the general officers and colonels serving in the militia at the time it is mustered into service. This would give them date of commission junior to regular general officers with whom they might serve, and prevent officers with a lifelong military experience coming under the command of a possibly inexperienced general deriving his position from political fortune. "It is only by an effective militia that we can at once enjoy the repose of peace and bid defiance to foreign aggression: it is by the militia that we are constituted as an armed nation standing in perpetual panoply of defense, in the presence of all the other nations of the earth."

INSTRUCTION OF OUR INFANTRY.

"The demands which war makes upon the troops must determine their training in peace. The tasks of a soldier in war are simple. He must always be able to march and to use

his weapon. He can only do so as far as his moral and intellectual qualities suffice and his bodily and military training are effective. Moreover, his performance will only be fully useful when it is guided by the will of the leader and regulated by discipline."—German Regulations.

As a preliminary to any joint instruction of the militia and regular establishment, the annual Army Register should include all organizations appearing yearly for muster in the United States service for instruction duty, just as completely as it does the organizations of the regular establishment, and (by concurrent legislation if necessary) each militia regimental organization should for purposes of reports, returns, annual inspections, and the receipt of general orders, be at all times considered as part of the command of the Department commander within whose territory it is located. This at the time of call into the United States service for instruction or other duty would at once bring it under the direct command of such Department commander, and as much within the reach of the regular staff departments, and at the nation's disposal for rapid mobilization as any portion of the regular establishment. The assembling of troops for instruction during the proposed thirty days' instruction service, would be at the judgment of the Department commanders, under the War Department, limited then, as now, with the regular troops, by the amount of money which Congress in its wisdom thinks such insurance against military disaster is worth. It is believed, no matter how unpopular the suggestion, that an essential to the smooth working of any joint instruction will be the calling of no militia man higher than colonel into the service, or as before suggested, empowering the President to appoint general officers of the militia when mustered into the United States service. It should be remembered, that as the nation is to be the gainer by this joint instruction, upon it will fall the expense of transporting and subsisting the troops on such duty and of paying the militia at such rates that thirty days' interruption to their regular occupations will not drive all good men out of the militia.

Each regularly organized brigade of militia upon request through the governor of its State should have detailed upon the staff of its brigadier, a United States officer, to be at the discre-

tion of the governor commissioned in the militia with, during his tour, such rank as the governor may deem proper. (Such appointments not to be considered a violation of R. S. 1222.)

Each State and Territory should be allowed to detail at the service schools with each army class that enters any number of qualified militia lieutenants that it may care to maintain on such pay and allowances as will permit them to accept the details.

It is not proposed to outline a course of instruction to be followed at any joint assembling of regulars and militia. It is thought, however, that other occasions should have imparted skill in all ordinary drills for bodies smaller than a regiment, and that this period might be devoted to drills, exercises and manœuvres where larger bodies are necessary. The permanency of location of the militia, and their annual assembling in the same department would seem to suggest that the instruction should be progressive from year to year, remembering that "it is of immense importance that the soldier, high or low, whatever rank he has, should not have to encounter for the first time in war, those things which when seen for the first time set him in astonishment and perplexity" and that while "steadiness under fire and calmness when threatened by danger cannot be acquired by manœuvres with imaginary enemies, almost every other virtue which a soldier should possess can be developed in time of peace."

The final responsibility for our infantry and other forces, their fitness for battle in organization and training, for their lack of it which one day may mean insult and humiliation for the best flag that floats, rests on those charged with the affairs of the Government. The problem should not be held in abeyance till the emergency arises. The strongest nation of giants suddenly aroused from slumber, unarmed and lethargic could not withstand the attack of the smallest army of Davids: "American liberty does not require that we live in a republic crippled in powers or endangered by humiliating weakness."

APPENDIX A.

HISTORICAL EXTRACTS SHOWING WHERE HOSTILITIES BEGAN WITHOUT DECLARATIONS OF WAR. 1800–1896.

Taken from Mr. Cutting's Report to accompany H. R. 7318, to 52d Congress, 1st Session.

On September 5, 1800, Russia seized two British ships in Russian ports and sent their crews prisoners into the interior without declaration of war.

On July 14, 1801, reprisals were ordered by the English Cabinet. All Swedish, Denmark, and Russian vessels in English ports were seized and a large English fleet under Sir Hyde Parker was dispatched to the Baltic, although there was no declaration of war.

On March 20th the Swedish inland steamer *Bartholomew*, wholly unprepared for any defense, surrendered at the first summons to a force of three regiments of foot and a detachment of artillery under Lieut. Gen. Trigge and a squadron under Rear-Admiral Duckworth.

In 1802 Napoleon sent a force of 20,000 men into friendly Switzerland and seized by surprises Soleure, Zurich and Berne.

On November 23, 1806, the Russian army, during negotiation and after full concessions, suddenly invaded Moldavia and seized Chotsim, Bender and Jassai.

In 1806 England sent an expedition against Curaçoa; her fleet suddenly entered the harbor, and Fort Amsterdam was assaulted and captured.

On March 6, 1807, England sent an expedition, during negotiations, into Egypt, and on the 21st of March the Governor of Alexandria accepted terms of capitulation.

In 1807 the English man-of-war *Leopard*, 52 guns, demanded of the *Chesapeake*, an American frigate cruising off Virginia, the requisition of some English deserters on board the *Chesapeake*. The American captain denied the right of search, whereupon the *Leopard* fired a broadside, killing and wounding several Americans in time of peace.

In 1812, Napoleon by sudden attack on troops of Kowno, declared war with Russia.

On June 18, 1812, the United States declared war against

Great Britain. During the month of April previous, however, a general embargo was laid by Congress upon all vessels in the harbors of the United States for seventy days.

In 1815 Murat, King of Naples, attacked Austria without notice.

In 1816 Portugal invaded the Spanish possessions on the river Plate without explanation or previous declaration.

In 1818 the United States, during peace with Spain seized Pensacola and St Mark's.

In 1821 the United States seized a French ship during time of peace.

In 1826 the King of Spain carried on hostilities against Portugal with willful falsehood, without declaring war, but professing friendship.

During the same year England, without declaration of war on Spain, dispatched troops to fight the Spaniards.

In 1827 the Turkish fleet was destroyed by Russia, England, and France without warning of war.

In 1828 the Russo-Turkish War occurred. Hostilities on both sides preceded declaration of war.

In the same year France sent an expedition against the Turks in Greece and captured five fortresses.

In 1831, without declaration of war, Russia fired into, sank, and captured Greek ships and joined in a formal attack upon Poros.

During this same year a French admiral carried off the whole Portuguese fleet and converted reprisals into war. And the King of Holland pressed his troops into Belgium and in nine days crushed the Belgian forces.

On February 22, 1832, France sent a squadron with troops and captured Ancona by sudden surprise during absolute peace between France and Rome.

In 1834 the Spanish army, without notice, crossed the Portuguese frontier, and, by a forced march, surprised and defeated the force under Don Carlos.

In 1835 the inhabitants of Texas raised the standard of revolt against the Mexican government, and declared themselves independent.

During the year 1838 an invasion of Canada took place

under circumstances described in the United States Congress as such "that the people were at war while their governments were at peace."

On the 17th of April, 1840, the British ships of war in the vicinity of Naples commenced hostilities and captured a number of Neapolitan vessels, and an embargo was laid on all ports of Malta that bore the Sicilian flag.

In 1844 hostilities by France against Morocco commenced by Prince de Joinville on not receiving a satisfactory answer to an ultimatum.

On May 13, 1846, the Congress of the United States passed a resolution that, by virtue of the constitutional authority vested in them, declared that a state of war existed between the Republic of Mexico and the United States. The President in his message recited many and various acts of hostilities prior to any declaration of war.

On October 22 the English and French fleet, under orders from London and Paris, entered the Dardanelles in express breach of treaty of 1841.

On October 23 Turkey declared war upon Russia and crossed the Danube to expel the Russians.

In 1847 a revolutionary junta had been established in Portugal and was carrying on a war against the queen. The war having dragged on for some time, England, France and Spain agreed to interfere, but no declaration of war was made.

In 1848 the Italian insurrectionary war broke out; the King of Piedmont at once joined his armies to those of the Italians, and the war from its nature, was carried on without any formal notice.

On April 25, 1849, the French General Oudinot entered citadel Civita Vecchia. The Roman Assembly protested in the name of God and the people against this unexpected invasion. A short time after there followed the siege and capture of Rome.

In 1850 and 1851 the United States waged the "unofficial" war against Cuba.

In 1853 and 1854 the Crimean War was raged. Hostilities preceded war as follows: The Russian Government seized the Danubian Principalities.

On May 31 the order for the passage of the Pruth was passed.

On June 2, before it was known in London, orders were sent to English and French Admirals to move up the Besike Bay.

In 1859, France and Italy against Austria. The Austrian government alleged that the actual commencement of this war was on both sides (as between France and Austria) declared to be due to prior hostile acts, not words.

On May 5, 1860, Garibaldi sailed from Genoa with 2000 troops to wrest Sicily from the King of Naples.

In 1863 war between Austria and Prussia on one side and Denmark on the other virtually commenced by the occupation of Holstein and Lauenburg by the troops of the two great powers.

In 1870, the war between France and Germany, the declaration of war clearly preceded war.

DURATION OF RECENT WARS.

Taken from a lecture delivered by Captain D. M. Taylor, Ordnance Department, U. S. Army, at San Francisco in 1885.

Year.	War.	Declared.	Decisive Battle.	Days.
1859....	France and Austria.....	May 3....	Solferino, June 24.....	52
1864....	Dano-German.....	Jan. 16 ...	Fall of Duppel, April 18...	93
1866....	Austro-Prussian.....	June 16...	Sadowa, July 3.....	17
1866....	Austro-Italian.....	June 20...	Lissa, July 20.....	30
1870....	Franco-German.....	July 15....	Sedan, September 2	49

APPENDIX B.

Taken from a paper by Colonel H. L. Turner, 1st Regiment Illinois National Guard.

The campaigns of 1894 have convinced the First Regiment that for field service the three battalion organization is an immense improvement over the old eight and ten company formations. During the entire summer's service the battalion was treated as the unit and its commander held responsible for the proper execution of all orders by every portion of his force—for its discipline and for the safety of the territory covered by it. As the major was rigidly held to a strict and wide responsibility,

he was given a commensurate authority. The regimental commander refrained carefully from direct dealings with company commanders, and permitted the majors to issue written orders as battalion commanders, in execution of regimental orders.

The utmost effort was put forth by the colonel to maintain such distribution of the troops that each battalion should remain intact, its companies covering contiguous territory. In a thousand ways this policy worked to the advantage of the service, and in two or three isolated cases wherein the commanding officer broke his own rule and meddled with the major's work he made a mess of it.

A STRATEGICAL STUDY. *

By Lieutenant H. H. Sargent, U.S. Army.

Author of "Napoleon Bonaparte's First Campaign."

"After a war one ought not only to write the history of what has taken place, but also the history of what was intended."—Von der Goltz.

UPON Bonaparte's return from Egypt in October, 1799, he found England, Austria, and the small states dependent upon them, waging war against France. The allies were united in an effort to crush the French Republic. They were sanguine of success. Against this formidable coalition France stood alone.

Before Bonaparte's return, a Russian army, commanded by Suwaroff, had also been fighting the French in Italy and Switzerland; but, having been defeated by Masséna, Suwaroff had retreated with the remnants of his army into the valley of the Danube, and thence had proceeded into Russia. The defeat of Suwaroff had caused the Russian Emperor, Paul the First, to believe that his army had not been properly supported by the Austrian armies. He therefore felt angry and bitter towards Austria. As soon as Bonaparte became aware of the state of the Emperor's mind, he collected the Russian prisoners then in France, gave them new uniforms and new arms, and sent them

* This article, published by permission of A. C. Mc Clurg & Co., of Chicago, is an extract from the Introduction of Lieutenant Sargent's recent work on the "Campaign of Marengo."

back to their own country. These acts and others of a conciliatory nature pleased and flattered the Emperor Paul, and enabled Bonaparte, soon after his return, to detach Russia from the alliance.

Of the two great powers at war with France, England had been more active and more successful upon the sea; Austria, upon the land. In the battle of the Nile, Nelson had dealt the French navy a terrible blow from the effects of which it never recovered. England was now mistress of the sea. Having her fleets in the Mediterranean and the Gulf of Genoa, she was prepared to assist Austria in her efforts to overthrow the French Republic.

During Bonaparte's absence in Egypt, Austria, aided by Russia, had pushed forward her armies to the boundaries of France. One large Austrian army,* in Western Germany was watching the crossings of the Rhine; another in northwestern Italy was fighting the French along the Apennines and Maritime Alps. From the theatre of operations, made memorable by Bonaparte's victories in 1796–97, Austria had almost driven the French eagles. Bonaparte's battles of Montenotte, Lodi, Castiglione, Arcole, and Rivoli, seemed to have been won in vain. Austria had all but reconquered Italy. Except along the narrow seaboard between the Apennines and the sea, no French soldiers were to be found upon Italian soil.

Such was the situation, when in November 1799, Bonaparte became First Consul of France. At this time his acts certainly indicated a desire for peace. He wrote to the governments of England and Austria, deploring the futility of a continuation of the conflict, and suggesting that the war should cease. His overtures, however, were coldly rejected. He was forced to fight. Against this powerful coalition peace could be obtained only by victorious battle.

Industriously Bonaparte prepared for war. France was in a deplorable state. The treasury was empty; the soldiers were ill-fed and ill-clad; recruits and supplies were obtained with difficulty; civil war existed in certain parts of western France;

* Though troops from several of the small German states, dependent upon Austria, formed a part of this army, it is referred to as an "Austrian army," because the bulk of the troops composing it were Austrians.

and the armies of the Republic had met with defeat again and again. Over the French people this condition of affairs had cast a gloom which the magic of Bonaparte's name alone could dispel.

During the winter of 1799–1800, his energy and activity were apparent everywhere. His proclamations aroused the spirit and patriotism of the French people, and gave them confidence in their government, and hope of success under his leadership. He placed the finances upon a firm basis, crushed out the civil war, caused arms to be manufactured, and supplies to be collected; and from the levies that he ordered he organized sufficient forces to strengthen materially the French military power. Of the two French armies in the field, he sent reinforcements to the Army of the Rhine, gave the command of it to General Moreau, and ordered General Masséna to take command of the Army of Italy, which, half starved upon the rocks of Genoa, was struggling heroically against overwhelming odds. At this time, too, he began to collect, drill, and organize, in different parts of France, bodies of men who were destined to unite near Lake Geneva, and together with other troops in France already organized, were to form a third army to be known as the Army of Reserve.

Before proceeding further it is necessary to describe the topography of the theatre of operations, to point out the situations of the opposing forces, and to explain the plans of the contending powers.

Bordering France on the east are Germany, Switzerland, and Italy. The Alps, covering Switzerland like a huge network, give to this country the appearance of an immense bastion which, extending east, separates Germany from Italy. From Switzerland these mountains extend through and beyond the Tyrol. They separate the valley of the Danube from the valley of the Po. In Switzerland they are known as the Swiss Alps; in the Tyrol, as the Tyrolese Alps. On the north side of them are the states of Swabia, Bavaria, and Upper Austria; on the south side, Piedmont, Lombardy and Venice.

Extending south from Western Switzerland to within about thirty miles of the sea, the French Alps form part of the boundary line between France and Italy; thence turning east they

approach the Italian shore, and are here known as the Maritime Alps; still farther east, along the shores of the Gulf of Genoa, they are called the Apennines.

With the exception of a few passes, this great mountain chain, almost enclosing Northern Italy, forms an insurmountable barrier to the soldier. Even over the passes, especially across the higher ranges, communication was, at the time of which we write, extremely dangerous. The snow and ice, the glaciers, avalanches, frequent storms and steep declivities, made these mountain roads hazardous and difficult for the passage of armies. The principal passes in the Swiss Alps are the St. Gothard, the Simplon, and the Great St. Bernard; in the French Alps, the Little St. Bernard and the Mont Cenis; in the Maritime Alps, the Col di Tenda and the Col di Ormea; and in the Apennines, the Col di Cadibona and the Bochetta.

Lying partly or entirely within this territory are three large rivers and their tributaries. They have their sources in or near the great chain of the Alps, and drain the tributary country. The Po rises in the French Alps, and flows east through Northern Italy. The Danube rises in Western Germany, and flows east through Bavaria and Austria. The Rhine rises in Switzerland, flows north into Lake Constance, thence, forming the outlet of the lake, flows west to Bâle, where it turns abruptly and flows north for the rest of its course.

Early in April 1800, an Austrian army of 120,000 soldiers commanded by Marshal Kray, guarded the right bank of the Upper Rhine. The right wing extended beyond Strasburg; the left, well up into the Alps east of Switzerland; and the centre, forming the greater part of Kray's army, occupied the Black Forest in the angle of the Rhine made by its change of direction at Bâle. Kray's line of communication was along several roads down the Danube to the Austrian capital.

Facing the Austrian army, on the opposite side of the river, was the Army of the Rhine, commanded by Moreau. Including the French forces in Switzerland, it numbered 130,000 soldiers, and extended from the St. Gothard on the right to Strasburg on the left. It had for a base of operations the frontier fortresses of France and Switzerland, which was then occupied by the French.

The Austrian army in Northwestern Italy consisted of 120,-

000 soldiers, and was commanded by General Melas. The greater part of it was in the vicinity of Genoa, and along the Apennines and Maritime Alps. The remainder, occupying the fortresses and guarding the entrances to the passes of the Alps, was scattered throughout Northwestern Italy. This army had its base of operations on the Mincio; and its line of communication was by several roads down the valley of the Po to its base, thence by two roads: one north through the Tyrol across the Brenner Pass into the valley of the Danube, the other northeast through Friuli across the Pontebba Pass to Vienna.

Opposed to the army of Melas was the Army of Italy. It consisted of 40,000 soldiers, of whom 36,000, commanded by Masséna, were holding the passes of the Apennines and Maritime Alps from Genoa to the Col di Tenda. The remainder, 4000 strong, commanded by General Thurreau, was guarding the Mont Cenis pass in the French Alps. The line of communication of the Army of Italy to its base of operations on the Rhone was by the Genoa-Nice road.

A British fleet, commanded by Admiral Keith was in the Gulf of Genoa; and a British corps, 12,000 strong, commanded by General Abercromby, was at Port Mahon in Minorca.

Such were the main features of the theatre of operations, and such were the positions and numbers of the opposing armies that were facing each other in Germany, France, Switzerland, and Italy, at the beginning of hostilities early in April 1800. Against the Austrian armies, supported by the British navy, and a British corps, which might at any time be thrown upon the coast of France, Bonaparte could not with his two armies, expect to make much headway. His chances of success were small; the odds against him were too great. Unless he could increase his own forces, a French victory was doubtful. Thus it was that early in the winter he had seen the necessity of creating an army of reserve, which could be sent to reinforce Moreau in Germany or Masséna in Italy as circumstances might require. But the Army of Reserve had not yet been assembled. The divisions composing it were still scattered throughout France. Their organization, however, was being rapidly pushed forward, with the intention that early in May they should unite near Lake Geneva and form an army of 40,000 soldiers.

On the French side, Bonaparte at the head of the French Republic had for the first time full control of all military operations. Hitherto, great as had been his achievements in Italy and in Egypt, he had acted as a subordinate, merely directing the operations of his own army; but now his military genius was to have full play.

On the Austrian side, the Aulic Council, consisting of twenty-one members, directed all military operations. This council, which held its sessions at Vienna, not only made the plans of campaign, but also issued detailed orders to the Austrian commanders, and furnished them information regarding Bonaparte's plans and manœuvres.

At this time the ablest soldier in Austria was the Archduke Charles. Already he had greatly distinguished himself in several campaigns. He reasoned that, inasmuch as Austria, England and Russia had failed to crush the French Republic in 1799, before Bonaparte's return to France, the allies stood little hope of success after Russia had withdrawn from one side, and Bonaparte had been added to the other. He therefore advised his government to accept Bonaparte's offer of peace. To the Aulic Council he also gave valuable advice upon the military situation. But no attention was paid to his suggestions. In fact, before the campaign opened, the Archduke was relieved of his command in the army, and sent into Bohemia in a kind of honorable exile.

The plan of campaign adopted by the allies was that the Austrian army under Kray in Germany should remain on the defensive, holding Moreau in check, if possible, while the Austrian army under Melas in Italy attacked the Army of Italy along the Apennines and Maritime Alps. By this means the allies expected that the Austrian forces in Italy, so superior in numbers to the French, would be able with the help of the British fleet to blockade Genoa, and to drive the Army of Italy across the Var into Southern France. This movement being accomplished, the purpose was that Melas, supported by the British navy, and Abercromby's corps, should invade France, and attack and capture Toulon. Furthermore, the allies hoped, by adopting this plan, to receive some support by the Royalists in the south of France. If this operation succeeded, it was expected that Moreau would detach a sufficient force from the Army of

the Rhine to march on Toulon for the purpose of driving back the allies; whereupon Kray could attack the Army of the Rhine, thus weakened, with much hope of success; that, in fact, he could take the offensive, force the crossings of the Rhine and invade France.

In this calculation no plans were made to attack the French forces in the great stronghold of Switzerland. If, however, the allies succeeded in their designs, Kray and Melas could unite their armies in France, thus cut the communications of the French forces in Switzerland, and smother them, as it were, between the two great Austrian armies.

In view of the facts that the allies were flushed with their recent victories, were superior to their adversary in numbers, and also held the mastery of the sea, they expected great results in the coming campaign. With so many advantages on their side, their plans seemed both reasonable and accomplishable. But they reckoned without the genius of Bonaparte.

On the other side, Bonaparte had two plans, both of which it will be well to examine that the reader may grasp the comprehensiveness of Bonaparte's intellect in originating strategic conceptions. Both plans were based upon the fact that the great stronghold of Switzerland, extending like a huge wedge between the Austrian army in Germany and that in Italy, was occupied by the French. This natural fortress, almost impregnable, could be used as a base of operations from which to attack either Kray in Germany or Melas in Italy.

The first plan conceived by Bonaparte was to leave Masséna in Italy on the defensive to hold Melas in check, then to unite the Army of Reserve with Moreau's army, cross the Rhine in force between Schaffhausen and Lake Constance, and attack that part of Kray's army occupying the Black Forest in the angle of the Rhine between Lake Constance and Strasburg. By an attack in this direction, Bonaparte calculated that he could defeat Kray, drive him north, sever his communications with Vienna, and either destroy or capture his army. If successful in this operation, he could descend the Danube and seize the Emperor's capital; then by taking possession of the Tyrol and the Carnic Alps, he could occupy the Brenner and Pontebba passes, which operation would sever the communications of

Melas in Italy and cut him from Vienna. With Kray's army captured or destroyed, with the French holding the only passes by which the Austrians in Italy could retreat, and with Bonaparte in possession of the Austrian capital, the campaign must end; the Austrian Emperor would be compelled to make peace. This plan had many advantages. It would, if successful, be far-reaching in its results; it would not only destroy Kray, but would paralyze the operations of Melas; it would, to use Bonaparte's expressive words, "reconquer Italy at Vienna."

Though this plan promised great results it was not carried out. A rivalry between Moreau and Bonaparte was the principal cause. The former being jealous of the latter, refused to serve under him. Though the First Consul had shown his confidence in Moreau, and, by appointing him to command the army of the Rhine, had recognized his great military abilities, nevertheless Moreau objected to having Bonaparte direct the operations of the combined armies in person. In fact, he stated that he would send in his resignation, if the First Consul took command of the Army of the Rhine. At a later day this would undoubtedly have resulted in Moreau's losing his command; but at this time Bonaparte was not in a position to force a quarrel with him. He had need of Moreau's great military talents. Furthermore, the commander of the Army of the Rhine had the unbounded confidence of the soldiers under him, and was at that time the only general in France, except Masséna and Bonaparte himself, who was able to direct successfully the operations of a large army. Victory was Bonaparte's object. To be victorious it was necessary to utilize the services of every great soldier of France.

Doubtless, too, in adopting another plan, Bonaparte was influenced somewhat by the hope of gaining a great victory with the army that he himself had created. If he could cross the Alps with the Army of Reserve and strike a blow which would decide the fate of Italy, he alone would reap the glory. Moreover, by following in the footsteps of Hannibal, he would be more likely to dazzle the French people, and to fix deeply in their minds the splendor of his achievements.

Bonaparte's second plan was that Moreau should cross the Rhine and attack Kray in such a direction as to push him back

from Lake Constance towards the north, that he should then detach a corps of 20,000 or 25,000 soldiers from his army and send them across Switzerland by the St. Gothard Pass into Italy where they were to unite with the Army of Reserve to be led by Bonaparte in person over the Great St. Bernard Pass. With these forces Bonaparte purposed to march south, cross the Po, seize the line of retreat of the Austrians, and force them to fight a battle to recover their communications.

Should he succeed in this manœuvre, a single victorious battle would decide the fate of the Austrians in Italy; for it would sever their communications and cut them from their base of operations. To Melas, therefore, a defeat would mean the ruin, capture, or annihilation of his army; to Austria it would mean the loss of Italy.

The success of this plan depended upon the skill with which Bonaparte could deceive the Austrians in Italy as to his intentions; for should they learn of the existence of the Army of Reserve, and of Bonaparte's intention to cross the Great St. Bernard, they could concentrate near the Italian entrance to the pass, and overwhelm the French divisions in detail as they issued into Italy. It was necessary, therefore, that the strength, destination, even the existence of the Army of Reserve, should be kept as secret as possible. To accomplish this Bonaparte published in the newspapers, and announced in various ways, that the Army of Reserve was assembling at Dijon in France, and that it would soon be sent to reinforce the Army of Italy. At the same time he took care to collect there only a few thousand men, consisting mostly of conscripts and old soldiers.

The wide publicity given the matter caused the spies of England and Austria to gather at Dijon, but finding there only unorganized conscripts and veterans too old for active service, they sent word to their governments that no such army existed. Consequently the Army of Reserve was believed to be imaginary, and was ridiculed and caricatured throughout Europe.

Both Melas and Kray were completely deceived. Feeling certain that there were but two French armies with which to contend, they had great hope of success. Moreover, the information received from the Aulic Council confirmed them in this opinion. Melas, in particular, regarded the matter as a *ruse* of

Bonaparte intended to divert the Austrians in Italy from invading France. He therefore felt secure in his positions, and pushed forward his forces with renewed energy. Feeling certain that he had fathomed Bonaparte's stratagem, he rested in a security which doomed him to defeat.

Meanwhile the divisions of the Army of Reserve were concentrating. They were marching through France, and were rapidly assembling near Geneva, from which place they were to be led across the Alps into Italy. This army, so secretly organized, and so derided throughout Europe; this army, whose very existence was doubted by the allies, was destined to amaze the world by the brilliancy of its exploits. Bonaparte will lead it over the Great St. Bernard Pass across the Alps, descend like an avalanche into the valley of the Po, cut the communications of the Austrians, and defeat them in the hard-fought battle of Marengo. He will emulate the deeds of Hannibal. He will lead 40,000 soldiers across the highest mountains of Europe, surmount every obstacle in his pathway, overthrow every force sent to oppose his progress, and by a single march and a single battle reconquer Northern Italy.

COMMENTS.

In making war upon France the Austrian forces were obliged to advance along both the Danube and the Po; for if they confined their operations exclusively to the valley of the Danube, they must yield Northern Italy to the French; or if they restricted their operations wholly to the valley of the Po, they must lose Western Germany, and leave unguarded the direct route between France and Austria. The Austrian forces were, therefore, divided into two armies: one of which confined its operations in the valley of the Danube; the other, to the valley of the Po. In advancing towards France, these armies became farther and farther separated from each other. Kray's army in Western Germany and the army of Melas in Northwestern Italy were separated by Switzerland and the great chain of the Alps. As Switzerland and the passes of the Swiss Alps were held by the French there could be no direct communication between Kray and Melas. Though the great highway of the Tyrol, which crossed the Alps over the Brenner Pass, was in possession

of the Austrians, it was so far in rear of the Austrian armies that reinforcements could not be sent over it from one army to the other without making a march of several hundred miles. In fact, the nature of the country was such that during active operations neither army could expect to receive any support from the other. They were independent armies of equal strenth. Each had a separate commander, and each had its own line of operations and its own line of retreat.

On the other hand, the three French armies were so situated that they could support one another. With Moreau's army on the Rhine, Masséna's along the Apennines, and the Army of Reserve between them near Lake Geneva, Bonaparte could move the last along the roads of Eastern France to reinforce either of the others as circumstances might require. In this way, Bonaparte could reinforce Masséna with the Army of Reserve, which would increase the Army of Italy to 80,000 combatants. Or should Masséna be driven back across the Var into France, Bonaparte could leave Moreau on the defensive along the Rhine with a part of his army, withdraw the remainder, unite it with the Army of Reserve, and with these combined forces added to the remnants of Masséna's army, destroy Melas in the south of France.

In the event that both Austrian armies succeeded in crossing the frontiers of France, we can imagine that Bonaparte would leave a containing * force before one to hold it in check, while he massed superior numbers to crush the other. As the Austrian armies would, in this case, enter France from different directions; one from the east, the other from the southeast, separated by Switzerland and the French Alps; and as the French armies, even while falling back would still be between the Austrian armies, Bonaparte would, from his central position, have the advantage of interior lines, and could rapidly combine his forces against his adversaries in succession.

How well he would have succeeded in this manœuvre can best be judged by what he accomplished by similar manœuvres.

* "Containing force. A body of troops charged with the duty of holding in check a body (generally numerically superior) of the enemy, while the main efforts of the army are directed against another portion of the hostile forces."—WAGNER.

In the Italian campaign of 1796–97, when the Austrians advanced against Bonaparte on both sides of Lake Garda, he united his forces at the foot of the lake; and, by throwing a strong force against one and then against the other of the advancing armies, defeated both in succession before they could unite. In these manœuvres, with a total force of 45,000 soldiers. he defeated 72,000 Austrians.

In the campaigns of Arcole and Rivoli, the Austrians likewise advanced with divided forces. In the former, 40,000 Frenchmen opposed 70,000 Austrians; in the latter, 44,000 Frenchmen opposed 65,000 Austrians. By skillful combinations, similar to those just described, Bonaparte defeated the Austrian armies in both campaigns.

In 1814 when the Prussians, under Blucher, and the Austrians under Schwartzenberg, were advancing from different points of the French frontier upon Paris, the results obtained by Napoleon's leaving a retarding force before one army, and by massing his remaining forces against the other were still more remarkable. With a force numerically inferior to either army opposed to him, he succeeded in winning battle after battle. Though in the campaign of 1814, we find strategical problems with which we are not now concerned, yet Napoleon's victories there in the face of such odds show what he might have accomplished, had Kray and Melas crossed the French frontiers and advanced on Paris.

But the combination that offered Bonaparte the greatest chance of success yet remains to be considered. Should Masséna be able single-handed to hold in check the Austrians in Italy, Bonaparte could unite the Army of Reserve, 40,000 strong, to Moreau's army of 130,000. This junction would give Bonaparte 170,000 soldiers with whom to attack the 120,000 Austrians under Kray. With such a superiority in numbers, Bonaparte would probably have annihilated the Austrian forces in the valley of the Danube.

But the mere superiority in numbers, which, by this combination, might have obtained in Germany, is not the only advantage which Bonaparte could have derived from the positions of the opposing armies. In order to understand the subject better and see perhaps, in a measure, the whole strategical situ-

ation as it appeared to Bonaparte himself, it will be necessary to examine somewhat carefully the positions of the opposing forces, and point out the advantages which the possession of Switzerland gave to the French.

Since Moreau's army was in position in France along the west bank of the Rhine from Strasburg to Bâle, and extended into Switzerland along the south bank from Bâle to Lake Constance. Bonaparte could use either France or Switzerland as a base of operations from which to attack the Austrians in the Black Forest. This angular base gave to Bonaparte a great advantage. His adversary could not know on which side to expect him. By making demonstrations on one side, Bonaparte might deceive Kray as to the real point of attack; then by massing his forces on the other, he might surprise and overwhelm him. Moreover, by crossing the Rhine in force between Lake Constance and Schaffhausen, he could strike the left flank of the Austrian divisions in the Black Forest, and might be able to defeat them in detail before they could unite. Even should Kray succeed in concentrating his divisions, he would be compelled to face south in order to give battle. In this position, his line of battle being parallel to his line of retreat, he must, if defeated, lose his communications. In this position, defeat meant ruin to his army; for with the loss of his communications he could not escape capture or annihilation.

On the other hand, Bonaparte's line of battle would face the north, and be perpendicular to his line of retreat. If defeated, he could fall back and cross the Rhine with little danger of losing his communications.

By uniting the Army of Reserve to Moreau's army, and by crossing the Rhine in force near Schaffhausen, Bonaparte could not only greatly outnumber Kray upon the battle-field; but could force him to fight in a position where an Austrian defeat would be fatal to the Austrian cause. By this manœuvre, Bonaparte would threaten the communications of the enemy without exposing his own; and would, if victorious, decide in a single battle the fate of the Austrians in the valley of the Danube. He could then march rapidly upon the Austrian capital, and could also seize the Brenner and Pontebba passes, which operation would sever the communications of the Austrians in

the valley of the Po. Such a manœuvre would paralyze the operations of Melas in Italy, and compel the Austrian Emperor to sue for peace.

Though this plan offered Bonaparte great results, yet in several respects it was somewhat difficult to execute. In order to gain a favorable position for attacking Kray in the Black Forest, Bonaparte would have to make a flank march from Bâle to Lake Constance; and subsequently would have to expose his own flank to the attacks of the enemy. But in this case the French flank would be protected by the Rhine; and as Bonaparte would march rapidly, he would in all probability succeed in crossing the river in force near Lake Constance before his adversary should discover his plan. Nevertheless, this flank march would be attended with considerable danger. In fact, every flank march in the vicinity of an active enemy is dangerous; for a commander who gains a position on the enemy's flank must necessarily expose his own flank to the attacks of the enemy. Even when his flank is protected by a river, he cannot cross it without taking some risks. Had Kray's army been assembled in force near Schaffhausen, where it could have attacked the French divisions in detail as they crossed the Rhine, Bonaparte would have had much difficulty in carrying out successfully this plan of campaign. "Of all the operations of war," says Jomini, "there is none more hazardous and difficult, than the passage of a large river in the presence of an enemy."

Had Bonaparte adopted this plan, he would undoubtedly have attempted to deceive Kray as to the real point of attack. If we form a judgment of what he would have done by what he afterwards did in the Ulm campaign, we can safely assume that he would have ordered at least one division to cross the Rhine from France, and to advance directly eastward upon Kray's army in the Black Forest. The march of this division would have deceived Kray, and would probably have led him to expect the entire French army from that direction. Bonaparte could then have made his flank march in safety, and could have crossed the river with little danger of having his divisions defeated in detail.

As a matter of fact, however, Kray had his army so widely dispersed that he could not in any case have concentrated a sufficient

force in time to oppose successfully the progress of Bonaparte. Even had he been able to assemble his entire army near Schaffhausen, it is doubtful whether, in the face of such odds, he could have prevented Bonaparte from crossing the river. Perhaps it will be well to substantiate this statement by an example. In the two passages of the Danube by Napoleon at Lobau near Vienna, in 1809, the difficulties were greater and the odds less than in the hypothetical case now before us. Furthermore, in these operations Napoleon was opposed by that illustrious soldier, the Archduke Charles. Surely, these facts warrant the conclusion that an army of 170,000 soldiers, led by the greatest captain of modern times, could have successfully crossed the Rhine in spite of 120,000 Austrians, commanded by Marshal Kray.

That Bonaparte could have executed this plan of campaign admits of little doubt. We have already shown why the plan was not adopted. But it is worthy of notice that, afterwards in the Ulm campaign, along almost identical lines, he carried out this great strategic conception with remarkable results. It is worthy of notice that in 1805 at Ulm in the valley of the Danube, he captured an Austrian army, under General Mack, by manœuvres similar to those by which in 1800 he purposed to overwhelm Marshal Kray in the Black Forest. It is worthy of notice that he then descended the Danube, seized the Austrian capital ; and that this march paralyzed to a certain extent the operations of the Archduke Charles in Italy. It is worthy of notice that this march was the principal cause which led the Archduke Charles to retreat before Masséna ; and that the Archduke's army would have been captured or destroyed, had not Napoleon been compelled to march north from Vienna in order to meet the Austrian and Russian armies on the field of Austerlitz.

Consider now the situation in Northwestern Italy. Since the French were holding the Apennines and Maritime Alps on the south, the French Alps on the west, and Switzerland on the north, they were in possession of the three sides of a rectangle, which almost enclosed Melas in Italy. Should Bonaparte decide to take the offensive there, he could attack the Austrians from the south, from the west, or from the north. This situation

gave him several advantages; for Melas could not know on which side to expect the French. Bonaparte might surprise his adversary; he might deceive him as to the real point of attack, and then mass his forces at some unexpected point where he would have the advantage of position.

On the other hand, Melas within the rectangle had the advantage of interior lines. He could, therefore, other things being equal, concentrate his forces more quickly upon any side than could Bonaparte. Should he learn in time where Bonaparte would enter Italy, he could defeat the French divisions in detail as they issued from the passes of the Alps. But in order to take advantage of his central position, he must be accurately informed of Bonaparte's movements. He must fathom his adversary's designs; otherwise the advantage of position could avail him nothing. Thus it is seen how the element of surprise became such an essential factor in these operations, and how important it was that Bonaparte should deceive the Austrians as to his real intentions. The success of the entire plan, the fate of Italy itself, hinged on this fact. It was the first great step towards success; it was the entering wedge of victory. Long before the campaign opened Bonaparte saw clearly this fact. In the midst of untiring activity at Paris, while momentous questions were engaging his attention, he contrived the strategem that deceived his adversary, and worked out the details that led ultimately to his triumph at Marengo.

Already some of the advantages which the possession of Switzerland gave to Bonaparte have been pointed out. It will now be noticed that he could safely assemble a large force in this almost impregnable stronghold, and could debouch therefrom upon the rear of the Austrians in Italy. In this way he could descend upon the Austrian communications with little danger of losing his own with Switzerland. Even should the Army of Italy be driven back to the line of the Var, as long as the French held this river and the French Alps on one side of the Austrians, and Switzerland on the other, Bonaparte had the advantage of an angular base, from either side of which he could march to attack the Austrians in Italy. In fact, the possession of Switzerland, extending east from the French frontier, gave to Bonaparte the advantage of an angular base in his operations against either

Kray in Germany or Melas in Italy. Moreover, Switzerland offered him a secure place where he could assemble his forces and strike either Austrian army a vital blow. Upon these facts was based not only the plan of campaign that decided the fate of Italy, but that grander conception which offered still greater results.

As previously stated, the Austrian plan of campaign was that Kray should remain on the defensive in Germany, while Melas took the offensive in Italy. There were several reasons for adopting this plan.

First: Austria had in the preceding year been remarkably successful in Northern Italy. Step by step she had driven the French from the Adige to the Apennines. Being anxious to hold what she had conquered, and hoping to continue her success in Italy, she gave Melas 120,000 soldiers, and directed him to take the offensive against Masséna.

Second: By making her principal efforts there, she could receive the support of the British fleet in the Gulf of Genoa, and possibly of the British corps in Minorca.

Third: The English favored this plan; for they saw in it a chance to gain possession of Toulon, which was a desirable acquisition on account of the naval establishments there.

Fourth: The Royalists of Southeastern France were in sympathy with England and Austria, and might possibly aid them at the first opportunity.

Fifth: Since Austria knew that Moreau's army was large, and that the Army of Italy was small, she believed that, by taking the defensive in Germany and the offensive in Italy, she could hold in check the larger army, while she overwhelmed the smaller with greatly superior numbers.

Consider for a moment the situation as it must have appeared at this time to Austria. Not aware of the existence of the Army of Reserve, she saw only Moreau's army along the Rhine, and Masséna's along the Apennines. Was it not reasonable to suppose that the 120,000 Austrians in Germany might hold in check Moreau's army of 130,000 while the 120,000 Austrians in Italy destroyed the 40,000 French under Masséna?

On the other hand, there were several reasons why this plan should not have been adopted by the Aulic Council.

With the Army of Italy in possession of the Apennines and Maritime Alps, flanked on the right by the fortified city of Genoa, Masséna had the advantage of a strong defensive position. Without an enormous superiority in numbers, it was a difficult matter for Melas to drive back the French. And even should he succeed in this undertaking, there still remained the line of the Var, a strongly fortified position, flanked on the north by the Alps and on the south by the sea; a position which could neither be turned nor be forced, except with greatly superior numbers and with desperate fighting.

To succeed offensively in Italy the Austrians had, therefore, to outnumber greatly the French. The French superiority in position counterbalanced the Austrian superiority in numbers. The Austrian plan allowed Bonaparte with inferior forces to hold in check for a time a large Austrian army in Italy, and left him free to direct his remaining forces upon the important points of the theatre of operations. By uniting the Army of Reserve with Moreau's army, he could outnumber his adversary in Germany; or by uniting the Army of Reserve with a corps of Moreau's army, he could descend upon the rear of Melas, and decide in a single battle the fate of Italy.

By remaining on the defensive in Germany, Kray gave Bonaparte the opportunity of taking the offensive there. This allowed him to make use of the angular base of operations formed by Eastern France and Northern Switzerland. Bonaparte, however, could derive no advantage from the angular base except by taking the offensive; for should he simply defend the line of the Rhine, he would be obliged to occupy both the Swiss and French sides of the river. In other words, he must divide his forces, must lengthen and weaken his line, thus giving his adversary the opportunity either to defeat the French forces in detail, or to force a passage across the river at some weak point. Furthermore, it was important that Bonaparte should take the offensive for other reasons than those already given; for should he once force the position of the Rhine and Black Forest, he would find no other great natural obstacles in his front as he descended the Danube towards the Austrian capital.

Because the strong position of the Rhine and Black Forest is a long distance from Vienna; because the more direct route be-

tween France and Austria is through the valley of the Danube; because no great natural obstacles, forming strong defensive positions, lie across this route near the Austrian capital; and because a French victory in the valley of the Danube may give the French commander an opportunity to make such dispositions as shall paralyze the operations of an Austrian army in Italy, it follows that the main effort for supremacy between France and Austria should take place in the valley of the Danube. There Austria should take the offensive; there, she should show her full strength; there, she should make one mighty effort to decide her own or her adversary's fate. "It is in the valley of the Danube," says the Archduke Charles, "that the blows are to be struck which are decisive of the fate of France or Austria."

Austria did exactly the reverse of what she should have done. By taking the offensive in Italy, and by remaining on the defensive in Germany, she gave Bonaparte the opportunity to remain on the defensive in Italy and to take the offensive in Germany. She gave him the opportunity to carry out a plan of campaign which offered him the greatest results,—a plan which was perhaps, on the whole, one of the grandest strategic projects ever conceived by the mind of man.

"To invade a country," says Napoleon, "upon a double line of operations is a faulty combination." Though the Austrian plan was that Kray should remain on the defensive in Germany, while Melas took the offensive in Italy; yet both armies were, under certain circumstances, expected to invade France. Separated as they were by impassable obstacles, Bonaparte could leave a containing force to hold one in check, while he massed overwhelming numbers to crush the other. Thus by adopting a double line of operations, Austria gave Bonaparte the opportunity of bringing superior numbers against either Austrian army. As the first principle of war is, to be stronger than the enemy at the vital point, it is always of the greatest importance that no plan of campaign be adopted which shall, at the very start, allow the enemy to bring superior numbers upon the battle-field. For the battle-field *is* the vital point.

The error of adopting a double line of operations might easily have been avoided by Austria. Had she left 50,000 soldiers in Italy to hold Masséna in check, and concentrated

190,000 in Germany to act on the offensive, she would have confined her main efforts to the more important route between France and Austria, and would have had greater chances of success.

Had this plan been followed, Bonaparte could not, by any strategical combination, have outnumbered the Austrians in Germany. Since it was necessary that the army of Italy should remain along the Apennines and Maritime Alps to prevent the invasion of France on that side, the maximum strength which Bonaparte could direct against the Austrians in Germany was Moreau's army of 130,000 and the Army of Reserve 40,000 strong. In other words, Bonaparte could bring only 170,000 Frenchmen to oppose 190,000 Austrians.

Furthermore, Northern Italy offered Melas many advantages for a defensive campaign. If hard pressed by Masséna, he could fall back to the Mincio, a strong position, flanked on the right by Lake Garda and on the left by the fortress of Mantua. If defeated in this position, he could retire into the Tyrol, where he would directly cover his communications with the valley of the Danube. In the mountains and defiles of the Tyrol, he could, if hard pressed, fall back to another strong position, fight again, and thus prolong the conflict. Moreover, Masséna could not advance eastward through Friuli towards Austria so long as 50,000 Austrians remained in the Tyrol; for they could then descend upon the flank and rear of the Army of Italy, and could sever the French communications without exposing their own to Masséna's attacks. Of still greater importance, however, is the fact that, had Masséna driven Melas through the Tyrol, or across the Carnic Alps, his success would have had little or no effect upon the operations of the 190,000 Austrians in the valley of the Danube. And why? Because the route between France and Austria through Northern Italy was longer than that through the valley of the Danube. Because the mountains of Austria on the side towards Italy offered strong defensive positions near the Austrian capital. Because the vital point of the theatre of operations was in Western Germany and not in Northern Italy.

The proof of this will be apparent when we examine the Italian campaign of 1796–97. Though Bonaparte fought his

way through Northern Italy, and crossed the Alps into Austria, this movement had scarcely any effect upon the operations of the Austrian army that was facing the two French armies, under Moreau and Hoche, on the Rhine in the vicinity of the Black Forest.

In this discussion it has been assumed, in order to point out some of the advantages of a defensive campaign in Northern Italy, that 40,000 Frenchmen, commanded by Masséna, might have driven 50,000 Austrians, under Melas, from the Apennines to and even beyond the Mincio. But this assumption is altogether improbable. Undoubtedly Melas could have held in check the Army of Italy along the Apennines. To prove this statement, consider for a moment what Bonaparte did in the same theatre of operations in 1796. Though he defeated 50,000 allies with 40,000 Frenchmen, his success was due in great measure to the faulty position of the allies. They were greatly sub-divided and separated. Their front was widely extended. At Montenotte he broke through their long line, then defeated them in detail at Millesimo, Dego, and Mondovi. Their faulty position was due to the fact that the Sardinian army, based upon Turin, and the Austrian army, based upon the Mincio, were attempting to cover their divergent lines of communication back to their bases of operations. Moreover, as they fell back along these divergent lines, they became farther and farther separated from each other. The error of separating their armies and of scattering their forces, caused by the attempt to cover directly their communications, made it easier for Bonaparte to defeat them than if they had been united into a single army, and had adopted a single base of operations. For Masséna to defeat 50,000 Austrians, based upon the Mincio, would therefore be a more difficult undertaking than was that of Bonaparte in 1796. But to do even what Bonaparte did in the early days of the first Italian campaign required a greater soldier than Masséna—a Frederick himself might have failed.

To the plan of campaign that we have suggested there was one objection: Marshal Kray did not have sufficient military ability to handle an army of 190,000 soldiers. To direct successfully the operations of so large an army is a great undertaking. Even to command and care for a much smaller one is no

small task. Hundreds of matters must be carefully considered. Not only the strategical and tactical manœuvres by which the commander concentrates his forces and wins his victories, but his communications, his means of transportation, the supplies for his army, the equipment and discipline of his troops, the abilities of his subordinate commanders, the topography and resources of the country, give him the greatest anxiety. He must give close attention to all these matters; for the neglect of a single one may lead to disaster. He must be brave, clear-headed, cool, cautious, and fearless; and be able to make a quick decision in critical times. He must have an eye for facts. He must weigh correctly all reports and rumors, and out of the doubtful information at hand sift the true from the false. He must see everything that is going on around him. His glance must penetrate the enemy's line; his vision sweep the whole theatre of operations.

As an army increases in size, so, likewise, the difficulties of commanding it increase. To manœuvre 190,000 soldiers, so as to obtain from them a fighting power proportionate to their numbers, requires the genius of a great captain. Neither Marshal Kray nor General Melas was equal to the task. Though both were brave soldiers, who had distinguished themselves in previous campaigns, neither had great military ability. In fact, the Archduke Charles was the only soldier in Austria capable of handling so large an army. He had already shown himself to be a great general. His views upon war were largely the outgrowth of his own successes. He was not wedded to the past. He saw the errors in the system of war so persistently advocated by the Aulic Council. He perceived the reasons for many of Bonaparte's previous successes. He had fought Bonaparte in Italy; and he comprehended, though somewhat dimly, Bonaparte's system of war. Moreover, his views upon the military situation were sound. Though he was far inferior to Bonaparte in military ability; yet, being the ablest soldier of Austria, he should have been made commander-in-chief of the Austrian armies, and should have been allowed to conduct the campaign in his own way. Probably he would not have succeeded against Bonaparte; and yet, who can say what the result would have been, had he commanded 190,000 soldiers in the valley of the Danube? Aus-

tria was perishing for want of a leader, yet among her distinguished sons she saw not her ablest soldier.

Why was the Archduke Charles not made commander-in-chief? Why did Austria deprive herself of his services at the beginning of a great war? It was because the Aulic Council, which decided all military questions and directed the operations of the Austrian armies, did not approve of the Archduke's views upon the military situation. He had advised Austria to accept Bonaparte's offer of peace, and had pointed out that, in case of war, the principal effort against France should be made in the valley of the Danube. But the members of the Aulic Council knew little about military matters; they could see no merit in these suggestions. With a narrowness which they had many times exhibited before, they continued to blunder on, neither willing to take the advice of their only great soldier, nor able to comprehend the strategical combinations which their errors allowed Bonaparte to make. They originated faulty plans, sent unreliable information to the Austrian armies, and exercised over Melas and Kray a fatherly control which hampered them throughout the campaign. In short, they failed completely to appreciate the situation. "To the Aulic Council," said Jomini in 1804, "Austria owes all her reverses since the time of Prince Eugene of Savoy."

That the Aulic Counsel should fail was inevitable. In war the opinion of a trained soldier on military matters is worth more than that of a congress of a hundred men. Whenever the members of a senate, or council, or a congress, attempt to decide military questions, they are sure to err; for being absent from the theatre of operations, they can neither see clearly the military situation, nor render decisions with promptness in critical times. Besides, their decisions are often half-way measures, neither one thing nor the other; like the laws passed by a bicameral legislature they are nearly all compromises. In war there must be resolution, boldness, decision; to compromise is to court defeat.

Before closing the discussion, it will be well to remark, that the most perfect strategy is of little value, unless it is executed with energy and culminates in victory. The difficulty lies not so much in the conception of great strategical projects, as in the execution of them. Strategy is only a means to an end. It

does not win victories; but it clears the way for the winning of them and adds to their value. It aims to bring a stronger force upon the battle-field, or to place an army in a position where victory will bring great results. But the battle must decide the struggle. "Even the weakest combatant does not lay down his arms to strategical manœuvres." It is victory upon the battle-field which settles the disputes of contending powers. There, amidst the clash of arms and the roar of cannon, amidst the shouts of triumph and the cries of despair, amidst the wounded, the dying, and the dead, victory decides the fate of armies and of empires.

RELATIVE EFFICIENCY OF INFANTRY AND LIGHT ARTILLERY.

By First Lieut. WM. E. BIRKHIMER, 3d U. S. Artillery.

IT is within the personal knowledge of our older and middle-aged officers, while the younger ones will learn it from reading, that, about 1880, and the years immediately following, the general trend of the military literature of that day was to inculcate the belief that improvements in fire-arms had enormously increased the importance of infantry relative to the other arms of service. According to this view, artillery and cavalry, relatively to infantry, had diminished in importance. German infantry writers appear to have been responsible for a good deal of this, but their theories found ready acceptance in some other countries, particularly in England, and more especially on the part of English engineers. All this the military periodicals of that time will verify.

In so far as this tide of professional opinion would push the light artillery into the back-ground, I did not believe the facts justified the conclusion. Consequently, in an article published in the Journal Military Service Institution in 1885, I endeavored to combat the inference adverse to the light artillery arm. The whole subject was gone over, with the sole desire to

arrive at impartial truth. As a result, the following conclusions were reached:

1. In range and accuracy, artillery has held its own.

2. The breech-loading principle, while affecting the arms of service differently, has done as much for artillery as for infantry.

* * *

4. The proportion of guns to troops has been increased.

* * *

6. In consequence of the greater use of field-entrenchments, the relative importance of artillery, which now more than ever is necessary to prepare the way to the successful assault of earthworks, has correspondingly increased.

It is purposed now briefly to follow the course of events since then, and ascertain whether they have vindicated the correctness of these conclusions.

This is no field for airing opinions that cannot yield to arguments based on facts. Comparisons, always objectionable except when above the suspicion of bias, are particularly delicate when involving distinct arms of service, and will only be tolerated by military men when characterized by candor.

In order to arrive at a just conclusion, it is necessary to know the salient features of the situation at the epoch—1885—when comparisons were formerly made, and what changes have been wrought since.

At that time the infantry were armed with, and expert in the use of, the Springfield rifle, or some equivalent weapon. An examination of the ballistic tables shows that the small-arms of the various nations at that time were about of equal value. At 2000 yards the only bullet with a striking velocity—400 feet—sufficient to kill a man when struck in a vital part was our own. We have seen a great deal written about the Turks at Plevna, sweeping away the Russians at 2500 yards distance; in point of fact the Peabody-Martini rifle, with which the former were armed, had a striking velocity at 2000 yards of but 397 feet.

Since then, the infantries of the more important governments have adopted the smaller-calibred, magazine rifle. In point of calibre our .30 inch is an average, the Russians having the same, while others range from .315 to .256 inch.

The following table will contrast the ballistic properties of the Springfield, and our present rifle musket. The firers are supposed to be lying down, the targets to be men standing:

Range in yards.	45 CALIBRE. Highest ordinate above line of sight in feet.	DANGER SPACE. Before target in yds.	DANGER SPACE. Behind target in yds.	Striking velocity	ANGLE. Elevation.	ANGLE. Fall.
					° ′ ″	° ′ ″
300	2.6	All	68	968	0.44.58	
400	5.1	65	49	932	1. 0.32	
500	8.5	44.5	39	886	1.17.18	
800	24.7	21	18.5	772.4	2.12. 2	
1000	33.5	13	11	711.6	2.58.10	
1300				582.2	4.12. 0	
1500						
	30 CALIBRE.					
300	1.2	All	106	1386.8	16. 7	20.34
400	3.3	All	78	1229.6	23.36	32.36
500	5.1	105	57	1103.4	32.30	48.16
800	16.5	32	27	897.7	1. 8.38	1.55. 6
1000	30.9	19	18	805.0	1.40.35	2.55.28
1300	64.8	11	10.7	692.6	2.40.58	4.55. 2
1500	100.8	8	7.8	627.3	3.30.30	6.39.36

The new rifle has, at 1600 yards, as great a velocity as had the old at 1300; while at 2000 yards, its striking velocity is 100 feet greater than that of the old. In flatness of trajectory, the new rifle has a great advantage. At 1000 yards, for instance, the elevation of the old was almost twice that of the new rifle. This is one of the great points of superiority of the new arm. This feature is conceded to be one of primary importance. Indeed, flatness of trajectory is one of the tests by which the excellency of any small-arm system is judged. It means not only greater range, but greater danger space. At 500 yards, the danger space of the Springfield rifle was 83.5 feet, with the present arm it is 162 feet; at 800 yards these spaces are, respectively, 39.5 and 59 feet; at 1000 yards, 25 and 37 feet.

Lieutenant Batchelor, U. S. A., in his valuable work on "Infantry Fire," lays down the rule, for individual fire,—every man firing at his will,—that the limit of effective range is that at which the bullet remains during its whole flight within the height of the objective. The preceding table shows that this does not exceed 400 yards for the Springfield nor 500 for the 30 calibre rifle musket. That work was written when the Spring-

field rifle was our infantry weapon. Its conclusions were predicated on the performance of that arm. But we are permitted to reason from the analogies of the two systems regarding the efficiency of the one last adopted. Lieutenant Batchelor further says that 1300 yards is the extreme infantry-fire limit, beyond which the work must be done by the artillery. Of course there are exceptions to both the 400 and 1300 yard rule; we cannot, however, reason fairly from exceptions, but from general principle only. Now, at 1600 yards, it seems that the angle of elevation, the angle of fall and the striking velocity do not vary greatly from the corresponding elements of the Springfield rifle at 1300 yards. Beyond 1600 yards, therefore, to use Lieutenant Batchelor's words, "the action should be left to the artillery." This with our present rifle: and this appears to be a liberal estimate in its favor.

The war of 1870–71 developed some curious facts in the use of fire-arms. The French rifle had an immensely greater range than the German. But no adequate or proportionate tactical result seems to have flowed from this circumstance. The singular fact is mentioned, and is accepted by our infantry writers, that as the Germans got nearer to the enemy's firing line their losses from his fire decreased. As a result, the tactical principle was adopted soon after that war in most European armies, of having infantry fire under control, and not, except in the last stages of attack, to permit the individual soldier to fire, as of old, as he pleased. It needs no demonstration to show that, if fire *can* be controlled in battle, so that the men will fire only at the range and object designated, what an immense advantage it will be to the side having such disciplined troops. Whether we will, in our volunteers, ever possess them, experience alone must decide.

Another fact brought prominently forward by that war was that having a superior small-arm does not necessarily mean victory to the army possessing it. The Germans had a small-arm inferior to their adversaries in every way. Yet this to them by no means meant defeat. Not only is it necessary to have superior fire-arms, but we must properly use them. And, notwithstanding the French on many occasions, but notably at St. Privât, used individual fire from 800 up to 1500 yards with considerable

success, still their fire regulations, issued five years later, forbade the body of troops opening fire, when advancing to the attack, at a greater range than 600 yards. That would mean not to exceed, perhaps, 800 yards with our present small-arms.

Our infantry drill regulations are, unfortunately, not adapted to the present infantry rifle; its prescribed zones of fire have no fitting application; and although it is true now as heretofore, that greater ranges may, under special circumstances, be utilized yet it is believed that it is making a liberal estimate to concede, as here is done, that the new rifle increases the radius of the zone of individual fire by 200, and of controlled fire by 300 yards.

Another advantage of the present small-arm is the application of the magazine principle. The popular idea is that this gives the soldier command at all times of an inexhaustible supply of bullets which he can grind out without stopping, like coffee from a mill. Indeed, some professional soldiers, in calculating the advantage of this arm, proceed apparently on this hypothesis. This, however, is a great mistake. Magazine carbines were used quite extensively by our cavalry during the last year of our war. The advantage of the magazine, and the limits of that advantage were then recognized. In fact, the immense superiority of the magazine rifle lies in stored-up power for exigencies, and such as generally occur at close range. It cannot be denied that, on occasions, which naturally we may assume will be rare, an opportunity will offer itself when the magazines may be used at distant objects, like troops in masses incautiously or unavoidably presenting themselves. This exceptional use can cut no figure as a claim to superiority. That claim rests clearly and undisputably upon the number of bullets it places at command of the soldier, upon the instant, and to meet a near approaching crisis. Exhaust the magazine, and the rifle, until time be taken to replace that magazine, becomes nothing but a single loader. And although the successful application of the magazine to the rifle has greatly enhanced its efficiency, still the advantages gained are limited in various directions. One has just been indicated. Another lies in supplying ammunition. Even with our old Springfield rifles, our authorities on its use in battle, point out the difficulties of ammunition supply, and raise a

warning voice against our expecting too much in action from the mere theoretical possibilities of the arm. The same will be true of the .30 calibre magazine rifle. With it more ammunition will be wasted than ever before. It must be supplied more bullets than the old one. The difficulties of meeting that demand will be greater than ever, and, unless experience is to be reversed, the supply will not always equal the demand. Another limitation is the physical powers of the soldiers. An interesting and instructive series of experiments were instituted in France to test this point. At 328 yards distance fifteen targets representing men in line at a few inches interval were fired at by ten men using magazine rifles. Each firer had a helper, who stood ready to exchange another rifle when that being used was too hot, which occurred with each rifle between the 20th and 25th round. The men fired as fast as they could. In a period averaging ten minutes for the entire party the firers stopped from exhaustion, having averaged per man 154.2 shots. The hits averaged 8.6 per cent.

Whether the .30 calibre bullet will have as fatal effect as the .45 is a question as yet in doubt. In 1892 the Ordnance Department instituted some experiments to determine this point. The officer making report says that "the stopping effect of the .30 calibre bullet is less than that of the .45 bullet, except perhaps, at very short ranges, when the bullet is much deformed on striking. Whether the former can be trusted to repel a charge of cavalry can only be determined by experience in actual warfare."

To meet this supposed lack of capacity to shock on striking, bullets have been experimented with in Germany and elsewhere, having the hard casing removed at the point, so as to mushroom on impact. It has even been stated in the army papers that our own department is looking in that direction. It is to be hoped that it will not be necessary to adopt such a bullet to help out our new rifle musket. It would be coming very near the domain of the explosive bullet, the use of which was condemned by the St. Petersburg Convention of 1868. Nor from the remarks of Doctor A. C. Girard, U. S. A., in the January, 1897, JOURNAL MILITARY SERVICE INSTITUTION, does it appear that the .30 calibre bullet is in need of such a destructive adjunct. He asserts

that the wounds produced by the .30 calibre are more destructive than those resulting from the .45 calibre bullet. This he attributes to the greater velocity of the former, which, when the bullet has that velocity reduced by the interposition of organized animal matter like the human frame and body, seems to act explosively when giving up this velocity. He reaches this conclusion from a great number of experiments directed to the ascertainment of this particular point.

What importance to attach to the representation officially made by some of our Inspectors of small-arms' practice, that, while the .30 calibre is more accurate than the .45 calibre rifle at 500 yards, it is less so at the longer ranges, is not now certainly known. Here no importance is attached to it. The new rifle is conceded, for purposes of this paper, to be as efficient at 600 as was the old at 400, while it has increased the radius of the zone of aimed fire by 300 yards. The magazine feature adds immensely to this efficiency in the critical phases of the battle, while in stopping properties the new is not surpassed by the older bullet.

So much for the infantry. How stands the artillery record?

In 1885 our 3.2-inch field-gun was in an experimental stage. The following table will set before us some of the prominent features of the artilleries of 1885 and of this year. Attention is directed only to the element of fire and its destructiveness; this, because by fire alone does artillery make its power felt, although its power is not only physical, but moral.

CHARACTERISTICS.	United States.			Germany.				France.			
	1885.		1897.	1885.		1897.		1885.		1897.	
Calibre in inches...	3.0	3.2	3.2	3.46	3.09	3.46	3.09	3.54	3.15	3.54	3.15
Weight piece in lbs..	820	793	829	990	858	992	860	1106	935	1168	937
W'ht charge powder.	1.00	3.5	3.75	3.35	2.75	3.30	2.75	4.2	3.35	4.19	3.30
do projectile, shell	10.	13.	13.5			15.4	11.2	17.6	12.3	17.5	12.3
do do shrapnel.....	10.5	13.	13.5	17.9	12.2	18	12.18	17.6	19.1	12.3	13.9
No. bullets in shr'nel	49	115	162	210	123			92			
No. fatal fragments, Shrapnel.....			200			300					
Muzzle velocity, projectile.....	1232	1635	1685	1456	1525	1427	1526	1492	1608	1493	1608

This table relates to the ordinary field-gun. The latter has

not changed as yet to keep pace with the magazine feature of the small arm; but in improved material used in gun construction and in character of projectiles adopted, there has been great improvement. The shrapnel of to-day is far ahead of that of 1885 in efficiency of fire-effect. And this fire-effect it is that measures the efficiency of light artillery, which is intended almost wholly to operate against animate objects.

At the same time the necessity for magazine small-arms was being practically met, it was recognized that the same principle, in a modified form, was applicable to artillery. This has been demonstrated in the successful construction and testing of the rapid-fire guns, or quick firers, as they are usually called. It has been said by competent authority that a quick firer must use fixed ammunition and smokeless powder; have successful breech mechanism and the recoil of gun taken up without disturbing the firer who sits on the trail seat. Already the construction of our present 3.2-inch field-gun has been suspended in favor of another possessing many of the quick-firing properties. This seems to be the first step toward the adoption of the quick-firer pure and simple, several kinds of which have been built and successfully tested on the proving-ground. There is a very prevalent idea abroad that this is the field artillery gun of the near, if not of the immediate, future. The expense attending change to it is doubtless what principally has deterred the governments of Europe from bodily adopting quick-firing field-artillery. The installation of the magazine rifle musket prepares the way for and makes possible the other.

Among the various types of quick-firers the Maxim-Nordenfelt may be selected to illustrate the features of the system. The gun weighs 600 pounds, the carriage 1269 pounds, the shell 12½, and a complete round 14 pounds 15 ounces. The number of rounds in a limber is thirty-six, the weight behind team 3100 pounds, well adapting it to horse artillery. The ammunition is fired similar to our small-arm cartridges. The rounds lie horizontally in the limber. Perhaps the most striking feature is the provision for absorbing recoil. This embraces three different parts: a trail-spade, a Buffington brake like our own, and an hydraulic cylinder. There is besides a traversing apparatus, which trains the gun right and left 9° without dis-

turbing the wheels. The gun slides in a cradle, to which the sights are attached. The force of recoil of the piece is principally absorbed by the hydraulic cylinder. It will be observed that this whole arrangement is but an application, in miniature, of the devices used for absorbing recoil and traversing that we see every day illustrated in the carriages of our heavy sea-coast guns. And as the gunner may stand undisturbed on the loading platform of our 12-inch barbette carriage when the piece is fired, so, in this field-piece, may he sit unmolested during the firing, attending only to the elevating and traversing apparatus.

The quick-firing field-piece is the counterpart of the magazine rifle, not that it is expected by any means that, in practice, on the battle-field, the terrific carnage will be wrought that is possible on the proving-ground against dummies. Artillery fire in battle which does not mean that the enemy is being hit is, except for moral effect, to be deprecated; but it undeniably is true, that once having established the range, the quick firing principle enables field artillery to overwhelm the point of attack or defense with a metal hail, this wholly within its own sphere of action and outside that of the infantry, thus placing light artillery upon a plane of superiority when combating even infantry armed with the magazine rifle.

Aside, however, from the quick-firing principle, it seems that the field-gun has kept pace in efficiency with the small arm. The enormous extent to which temporary field-work or equivalent protection must now be resorted to, is everywhere recognized. The torpedo shell is far better calculated than any invention of a preceding decade to knock to pieces and render such works untenable, and this, whether we use them with percussion fuses as the French prefer, or with time fuses like the Germans.

As to which arm, artillery or infantry, smokeless powder has done most for is a question. In some armies no other kind of powder is used for field armaments. We have not formally abandoned the old field-gun powders, although the Chief of Ordnance says that the use of smokeless powders in the 3.2 field-gun is wholly practicable. In so far as its advantage to the firer at the firing point is concerned, the attribute of smokelessness seems equally favorable to both infantry and artillery. It does not give the enemy a clue to where the firer is. On the

other hand, with the longer small-arm ranges now practicable, infantry will still, and more than ever, be puzzled to know where their bullets are striking. The artillery can determine this point very well from the smoke of the bursting charge. In some services a particular composition, calculated by its smoke, to reveal the spot where the projectile explodes is used for ranging purposes, and so successfully, that the German artillery never pretend to use any other range finder.

With 1600 yards as the radius of the outer zone of infantry controlled fire, using the reduced-calibre bullet, it follows that field artillery has yet a wide space to manœuvre in outside of this zone, and yet keeping the enemy under effective fire. Our light artillery drill regulations establish 3000 yards as the superior limit of field-gun fire. This is rather under than over the generally accepted limit. But, accepting it as correct, we have thus a zone of about 1400 yards in breadth over which the artillery, after arriving within effective fighting distance of the enemy, may manœuvre without serious detriment and before coming under the controlled fire of opposing infantry in line of battle. With the improvement in projectiles that has signalized the advance of field artillery during the past decade, this fact will greatly enhance the destructive power of the latter. It is conceded that the distance at which artillery can be placed *hors de combat* should it incautiously or accidentally come too close to infantry has been increased by the adoption of the small calibre infantry weapon. It will, however, be the care of artillery to keep beyond this range except in cases where the facts as they arise on the battle-field call for and justify the risk and possible sacrifices. On the other hand, the artillery offsets this advantage by its greatly enhanced destructive powers whilst operating clearly within its own ranges, yet outside the effective ranges of infantry fire.

The proportion of guns that accompany an army depends upon many circumstances. The character of the country operated in would be an important consideration. During our campaign of 1864 neither General Grant nor General Sherman was operating in territory favorable to handling artillery. As a result they reduced their number of field-guns. But terrain is not the only consideration. Field artillery requires for its success-

ful employment an officer in command who is skilled in marching and fighting it. The fact as to whether such an artillery officer is or is not on the staff of the commanding general to advise and assist the latter in all that appertains to the artillery arm will always exercise a preponderating influence on the importance of the rôle that will be assigned to it.

Our light artillery drill regulations prescribe from three to four guns for each one thousand men of the army. In Europe the tendency for many years is to increase the proportion; in Germany and France it is between five and six and in Italy about four guns. The other military nations are in about the same condition. Change is in the direction of increasing the number, and whether or not it be erroneous, the principle certainly at this time is being proceeded upon, that, relatively to other arms, field artillery demands and should receive more attention. The importance attached to its fire-effects is now greater than ever. Instead of falling to the rear, it is forging to the front in the race of the various arms of service for precedence.

From this review it appears, therefore, that it is but stating the case in moderate terms to say that, since 1885, light artillery, relatively to infantry, has lost none of its importance.

HOW TO IMPROVE THE CONDITION AND EFFICIENCY OF THE NATIONAL GUARD.

By Major HOWARD A. GIDDINGS, C. N. G.

"At no time of peace will this country ever maintain a large standing army, nor will the people of the United States ever give into the hands of the general government the control of the Militia, or take that power away from the several states. Hence it is the bounden duty of those in whose hands our military forces, National and State, are placed, to endeavor in all ways to build up and encourage by all reasonable means the militia organizations of the several states, and to foster on the part of the states, increased organizations, effective armament, intelligent instruction, practice and discipline."—Col. J. M. Rice.

BEFORE considering measures for the improvement of the National Guard we may briefly review its relation to the nation and the several states, and its present condition.

The militia of the United States, consisting of all able-bodied men, except those who are exempt by law, has, as is well known, in reality become divided into two classes, the organized and the unorganized; the organized militia being generally known as the National Guard.

The National Guard of each State is uniformed, equipped and paid by the state, as its Legislature may direct. The organization and systems in the different states have a general conformity, and are in the main modelled after the U. S. Army, being arranged into companies, battalions, regiments, brigades and divisions, comprising one or more arms of the service.

The officers of the National Guard are commissioned by the Governors of their respective states, who may order out the militia for the purpose of enforcing the laws of the State. The National Guard may be called into the service of the United States for a period not to exceed nine months, by the President, who may address his request either to the Governor of the State or to an officer of the militia. When in the service of the United States the militia receive the same pay and allowance as the regular troops, and are subject to the rules and articles of war.

In time of peace the general government exercises no control over the National Guard, each State being supreme and

independent in the control of its troops. It is this which makes it so difficult to secure that uniformity in administration, discipline, instruction and equipment, which is necessary to the full development of the National Guard as a reserve force of the United States.

The latest reports from the Military Information Division of the War Department (1895) show the organized strength of the National Guard as 115,669. California, Kansas, New Jersey, Pennsylvania and Texas have division organizations, and some thirty states have brigade organizations. While the states generally endeavor to follow the organization laid down for the Regular Army, the number of modifications of this system is very great. There are 57 general officers of the line—6 major-generals and 51 brigadier-generals. There is no fixed rule as to appointment of general officers; some are elected and some are appointed by the Governors.

Company officers are elected in all states except Washington. In 32 states an examination is required; in 16 states no examination is required.

Army officers are on duty in 33 states. In 1895 twenty-five officers were detailed at the request of Governors to attend encampments of the troops, in addition to those on duty with the militia. Encampments were held in 26 states, varying in duration from four to twelve days. Regular troops were encamped with state troops in five states.

The appropriation by the states for the support of the militia is about $2,834,975. Two states, Arkansas and Nevada, make no appropriation. The annual appropriation $400,000 made by Congress for the support of the militia, is divided among the states according to the representation to which each is entitled in Congress.

In about two-thirds of the states the troops are armed with the Springfield rifle and carbine cal. .45 of various patterns. In the remaining third the armament consists of an assortment of Springfield, Peabody, Sharps, Spencer, Marlin, Remington and Whitney rifles, some of 38, some of 45 and some of 50 calibre. Happily, under the provisions of recent legislation this state of affairs will be quickly remedied.

The artillery armament is mostly obsolete 3-inch muzzle-

loading guns. The artillery harness is reported to be old and practically worthless.

The undress uniform in all the states is that of the Regular Army. In some states the troops have the army dress uniform; in others private dress uniforms of various patterns, and in still others the troops have no dress uniform.

Weekly drills are held in over thirty states.

Numerous plans for the improvement of the militia have in the past been considered and dismissed as too radical and impracticable. Most of these schemes have failed to win approval because they did not properly recognize existing conditions. No scheme can be effective that is not adapted to the variety of conditions in the different states, and that cannot be carried into effect without materially disturbing existing conditions.

Recognizing the limitations of our militia system, and the reasons and necessity therefor, the following measures are advanced as feasible and practicable suggestions for the improvement of the condition and efficiency of the National Guard.

1. The adoption of a uniform standard in the several states in equipment and uniform.

"If the militia were called into active service, probably the greatest defect would be found in the incompleteness of equipment—particularly in those articles which are needed more especially in the field."—Report Military Information Division, A. G. O., 1895.

Although the troops in all the states are supplied with the army service uniform, it comprises in many cases only those articles necessary to give the troops a presentable appearance as soldiers, while the more important articles necessary for field service are lacking.

The outfit should in all cases include the campaign hat, flannel shirt, overcoat, web cartridge belt and leggins, and every man should be required to have on hand a pair of stout broad-toed shoes, with heavy soles. Each state should have on hand a liberal supply of regulation blankets, ponchos, shelter tents, Buzzacott mess outfits, and cooking utensils, and the regulation haversacks, canteens and mess kits should be in the hands of the troops.

Sealed ammunition should be kept on hand in the armories

of all the troops, to the extent of 100 rounds per man. At present, in 14 states the amount is only twenty rounds per man. A liberal reserve should be kept in the state arsenals, as in the state of New York, where 600,000 rounds are kept in reserve. All officers should be equipped with regulation Colt revolvers and a supply of revolver ammunition should be in the armories and in reserve.

2. The development of the artillery arm.

The inadequate strength of the artillery arm in the Regular Army and the almost total absence of this arm in the militia, imperatively calls for the development of a foot or garrison artillery force in the National Guard, especially in the sea-coast states where government fortifications are located.

The appropriations for coast defenses since 1887 amount to $26,565,276, and for armament and fortifications since 1888 $12,153,297. $10,000,000 have already been spent in building and putting in place high power guns; yet the artillery force of the army is so inadequate that there have not in 25 years been any troops guarding the entrance to Philadelphia, nor to Wilmington, N. C.; Charleston, S. C.; Savannah, Mobile, New Orleans, Galveston, San Diego, or the great inland sea, Puget Sound.

There have never been any available troops for station at Sandy Hook, now Fort Hancock. $750,000 has been spent in putting guns there, and for want of care the sand is drifting in and out and destroying the efficiency of the batteries.

At the meeting of the National Defense Association, a public spirited body organized for the purpose of doing something toward adequate defenses, held at Tampa, Florida, on Jan. 20, 1897, at which eighteen states were represented, resolutions were adopted as follows:—

Whereas, The service of modern coast-artillery demands from troops assigned thereto both long and careful instruction, and

Whereas, The present foot batteries of the United States Army (approximately 3200 officers and men) are of strength insufficient to furnish even one cannoneer for the service of each piece of ordnance contemplated by the provisions of the "Endicott Board," and

Whereas, It may be considered inexpedient to maintain in time of peace a force of coast-artillery greater than that proposed by the bill known as the "Lamont bill," now pending in Congress, therefore be it

Resolved, That this convention earnestly presents to the attention of the Legislatures of the several sea-coast States, wherein are located works of the United States erected for the defense of the coast, the urgent necessity of adding to the existing force of the National Guard (militia) of each State, such batteries, battalions, or regiments of foot (garrison) artillery as may serve in the several cases as a trained reserve, ready for instant reinforcement of the regular foot-artillery of the United States; and be it further

Resolved, That assistance should be rendered to the several sea-coast States in the development of said National Guard (militia) reserve of coast-artillery, through suitable legislative enactment upon the part of the Congress of the United States.

The most commendable efforts at instruction of troops in heavy artillery drill have been made in Massachusetts. The following extracts are taken from the report of Major Miller, 5th Artillery, U. S. A., upon the encampment of the Massachusetts Volunteer Militia in 1894.

"At least one regiment of infantry is required to be drilled and instructed as heavy artillery. The First Regiment was the one so detailed, and encamped at Fort Warren, August 13–18. It was a very strong regiment of three battalions, having present 47 officers and 678 men.

"The heavy gun drill included the forming of companies into detachments, marching them to the 8-inch converted rifle casemate guns, posting detachments at same, and drill at the manual of the piece; also mechanical manœuvres dismounting and mounting a 10-inch Rodman with gin, slinging the piece for the purpose by the sling from cascable to muzzle, and by trunnion and cascable sling; also actual target practice with the 8-inch converted rifle. In 1892 this same regiment encamped at Fort Warren, and in my report of the firing I made the following remarks: 'The angle measuring and plotting was done by details from the regular garrison. The officers and non-commissioned officers of the militia should be familiar with that kind of

work. A few practical lessons in the company armories is all that is necessary to cause the method to be learned.' Since then the Adjutant General of the state has had put in the armory at Boston, 2 transits, 2 8-inch protractors, a plotting board, 1 model 8 inch S. B. gun, 1 model S. C. mortar centre pintle. The result is that enough of the officers and men trained themselves in reading the transit and protractors, laying off lines by scale, etc., to do their own angle measuring, signalling, and plotting of shots at the artillery firing this year. I think this work a very profitable one, both for the State and the United States, as this regiment would certainly be able to handle heavy guns in case of need."

3. Combined encampments of Regular and State troops.

The advantages of combined encampments of Regular and State troops are mutual. The state troops learn from the regulars, and the regulars better appreciate the state troops, that mutual confidence and respect being fostered which is the soundest basis of successful coöperation in time of war.

The State of Vermont has taken a most commendable step in purchasing a camp ground adjoining the United States Military Reservation at Fort Ethan Allen. The two reservations comprising some 1000 acres can become the theatre for extended battle tactics to be participated in by State and National troops combined, greatly to the advantage of both.

In 1895 the Regular Army contingent encamping with the Vermont troops consisted of 1 major, 3 captains, 3 lieutenants, 1 troop of cavalry and one company of infantry. Captain H. E. Tutherly, 1st Cavalry, in reporting on the encampment says: "State and National troops, officers and men, united their hearty efforts in making the week one of interesting and profitable instruction. The consensus of all reports coming to me is that the Vermont troops have never accomplished so much at any previous annual muster, and a large measure of this success is attributed to the presence of Regular troops as an object lesson, and the harmonious coöperation of Regular and National Guard troops in the exercises of the encampment."

In Wisconsin the 3d U. S. Infantry, 2 troops of the 7th Cavalry and Capron's battery of light artillery encamped with the Wisconsin National Guard on the state reservation. The

practice of encamping regulars and state troops should be extended as far as practicable in all the states. The great advantage of numerous military reservations suitable for the combined encampment of regulars and the troops of two or more states should not be overlooked by the Government and such tracts should be acquired without delay, especially in the East, where suitable tracts will soon be unobtainable except at great expense.

A combined encampment has aready been attempted by the Naval Militia of New York, Connecticut and Rhode Island, but it was "combined" only in name as no one officer was in supreme command. It was found in this connection that troops of one state cannot in time of peace lawfully be ordered to do duty in the territory of another state. This difficulty would be obviated by encamping the troops on a Government reservation, and they by the act of accepting the use of the reservation would place themselves under the direction of the officer in command, who should be of rank suitable for the command of the combined forces.

4. The establishment of a Bureau of the National Guard, at the War Department, in charge of suitable officers, who shall devote their whole attention to the development of the National Guard.

Probably the greatest present need is to provide for the organization of the troops of the several states into a compact and effective force when called into the field.

In case of a war doubtless the first move would be to place the Regular Troops in the field, and immediately afterward the National Guard would be mobilized for active service.

It is not pleasant to contemplate the tangle and confusion, the rivalries, jealousies and disputes that would ensue were the troops called out to-day,—all for lack of a previously planned war organization with a known assignment of troops and a just and equitable arrangement for their command.

The plans for such an organization should be the first work of a Bureau of the National Guard. The officers detailed for duty in this bureau should be of suitable rank and number, and of known sympathies with the Militia.

The department would exercise no control or command over the troops, but would devote its efforts to the securing of uni-

formity in equipment, discipline and instruction, by advisory methods, and to assisting the growth and development of the guard in every possible way.

There is no doubt but that the wonderfully rapid development of a naval militia in nine states, into a most efficient and valuable force, uniformly equipped and instructed, is due largely to the efforts of the Honorable Assistant-Secretary of the Navy, Mr. William McAdoo, who has himself personally inspected the naval militia in a number of states, besides being present on cruises and at encampments, reviewing the troops, delivering lectures, etc.

The officers on duty in the Bureau of the National Guard should include all those on duty with the different states and detailed to attend encampments. All reports from these officers would be sent through this bureau and all inquiries upon military matters from state officials or members of state troops would be answered by it. Its scope would be so wide and its usefulness so great that they can only be outlined in this paper.

5. The establishment of a Department of the National Guard at the Artillery School, Fort Monroe, Va., and at the Infantry and Cavalry School, Fort Leavenworth, Kan., with Lyceum courses for the instruction of National Guard officers.

It has been said, truly, that the greatest credit is due officers of the National Guard who attain even a passable knowledge of the military art. The Regular officer has every advantage; educated at the finest school in the world, with an abundance of time for study in his army life, and associated with officers from whom something is always to be learned, it is no wonder that he ranks high in his profession.

But the task of the officer of the National Guard is to learn that most difficult of all professions, the art of war, in the intervals which he can snatch from the requirements of his vocation, with no advantages, no helpful associations, few opportunities and little time.

There are many officers in the National Guard who would gladly avail themselves of any opportunities for improvement which the Government will hold out.

The state of Kansas has already availed itself of an opportunity to have its officers instructed at the Fort Leavenworth

school, as explained by Major Haskell, 24th Inf., in his report on the Kansas National Guard, viz.:

"The state made an appropriation of $1000 for officers school, and last year 76 officers, including 1 major-general, 3 brigadier-generals, their staffs, and the officers of three regiments were ordered to Fort Leavenworth for instruction.

"I was placed in charge, and having found out what they desired to know, had them formed into three companies, and, after explaining the movements, had them go through every movement from the position of the soldier to the end of the school of the battalion. The brigadier-generals, colonels, majors, captains and lieutenants took off their blouses and, putting on enlisted men's blouses, went through all the movements, handling their rifles as enlisted men; they were also instructed in guard duty, acting as adjutant, officer of the day, officer of the guard, were posted as sentinels instructed in ceremonies, in extended order, etc. They drilled three times each day, and after each drill went to an object lesson; in guard mounting in the morning, drill of the garrison companies at 1 P. M., the drill being different each day, as company close order, battalion extended order, and regimental drill, and after their afternoon drill they were assembled to see parade.

"In the evening they gathered in the lecture room of Sherman Hall and listened the first evening to Captain Swift, 5th U. S. Cavalry, on 'Orders and Correspondence'; the next evening to Captain Wagner, on 'Outpost Duty,' which lecture was exemplified in their presence the next day with a battalion. The next evening Captain Beach lectured to them on 'Hasty Intrenchments,' and the next day this was exemplified with a company from the garrison throwing up intrenchments on one of the hillsides. On the next evening Captain Sanno lectured the subject, 'The Relations of the Civil and Military.'

"These lectures were attended by all the officers, and they were allowed to ask all the questions they chose. They brought their own tents and camped on the West End parade."

It is suggested that each state be allowed to annually send five officers for every 1000 organized troops, to one of the schools for a two weeks' course of instruction, about 575 officers thus being under instruction at one time.

The instruction during the two weeks' course at the school to be similar to that pursued with the Kansas officers, consisting of lectures and object lessons in connection therewith. The course would continue through one year, beginning and ending with a tour of two weeks at the school; officers to be detailed who are desirous of taking the course, and from whose instruction the state could derive the greatest advantage. The first two weeks' instruction would necessarily be somewhat elementary, but officers having the time and inclination could be allowed to remain as much longer as they desire.

Upon returning home, and during the succeeding year instruction would be continued by the correspondence method. Printed lectures would be sent the student officers from time to time, say weekly; the first being perhaps on "Organization, particularly of the United States Army," followed by others on "Security and Information," "Transportation of Troops," "Marches," "Camps," "Military Supplies," "Military Law," etc., similar to the lectures by Captain Pettit, printed for use in Yale University.

At the end of a year the student officer again reports for a two weeks' tour at the school, prepared to derive the full benefit from what he sees and hears. The lectures this time are upon more advanced subjects: the use of the three arms, attack and defense of woods, convoys, houses, villages, defiles, bridges, earthworks, street fighting, etc. Passage of rivers, orders for battle, elements of strategy, and the battle; illustrated as far as may be by object lessons.

At the completion of this course the officer is examined and if found proficient is given a diploma, and his name is printed in the Army Register.

In the course of six years 1700 officers would take the course, —nearly 20 per cent. of the officers of the organized militia.

By the above plan, at slight expense to the states, and less to the Government, the efficiency of the militia, through the better instruction of its officers, can be vastly increased.

6. Thorough examination of all officers, with a uniform standard in the several states.

Hardly anything could conduce more to the improvement of the National Guard than to insure a high standard for its

officers by requiring them to pass a thorough examination.

As we have seen, in 32 states an examination is required either before or after the officer is commissioned; while in 16 states either no examination is required, or a lack of enforcement of the laws makes it amount to the same thing.

Even among the states in which examinations are required there is a very great variation in the standards. Almost without exception the examinations are oral, and if the officer displays any knowledge or aptitude whatever he is passed.

To insure a reasonable standard of intelligence and military knowledge all officers should be subjected to a written examination. The standard should be uniform for like grades and positions, in all the states. This could be readily brought about by the preparation by the Bureau of the National Guard of model examination papers, to be issued to the states. The examination should cover the general education of the officer, his general military knowledge, knowledge of the drill regulations of his arm, and his particular duties, general military law, militia law and regulations of his state, and minor tactics.

7. The suppression of independent military organizations.

Independent military companies should be prohibited by law, in all the states, as they now are in Pennsylvania, New Jersey, Kentucky, Georgia and Florida. They are a direct detriment to the National Guard, through the superior inducements they hold out to young men, in the shape of showy uniforms, indefinite term of enlistment, easy and slight military duty, and the general good time for which they exist.

The member of an independent company gets in and out of it as he pleases; he is subject to no law more binding than the company by-laws; he gives up no vacations to attend camp, and receives no military training beyond the manual of arms and marching in single rank; yet by reason of fine uniforms and frequent social festivities the independent company to a certain extent eclipses the hard working and more plainly uniformed company of the National Guard.

Some independent companies have as many as eight or ten different uniforms, many of them rich and elegant, and in others the undress uniform of the enlisted men is the same as that of officers in the United States Army.

Independent companies, which without exception exist only for purposes of show and parade, should be prohibited, to prevent their drawing young men away from the National Guard, in which they are taught at least the rudiments of the soldier's profession, and are prepared to serve their country when the necessity arises.

8. The increase of the National appropriation for the support of the Militia, to $2,000,000.

The Adjutant Generals of 37 of the states recently petitioned Congress to increase the National appropriation for the support of the Militia, from $400,000 to $2,000,000.

The letter of the Adjutant General of the state of Alabama, upon this subject, is so strong and well put that it is here quoted in part.

"Under whatever name designated, whether Volunteers, National Guard, or State Troops, the Militia of the United States as now organized, consists of 115,669 men, for the arming and equipping of whom the United States now annually expends the sum of $400,000, or not quite $4 per man. The state of New York appropriates for the support of the militia of that state alone a sum greater than the entire amount expended by the United States on the militia. The states in 1895 expended the sum of $2,834,974, or an amount seven times as great as that of the United States.

"The United States appropriated in 1808 the sum of $200,000 when the total population of the United States was less than 7,000,000, while to-day, with its borders vastly extended, its interests requiring protection immensely increased, with a population of over 70,000,000, with munitions, arms and equipments of war requiring months where they required days then to prepare, and costing ten times the amount they did then, the appropriation is but $400,000. $400,000, to arm, equip and keep in readiness for war 116,000 men!"

It would not seem to require unusual intelligence to discern that the annual expenditure on the National Guard, of a sum just large enough to keep it in existence, but not enough to properly equip it and keep it in efficient condition, is penny wise and pound foolish; but in our country the grim tonic of calamity alone avails to work a cure in many military ills. Should the

Government be compelled to place the National Guard in the field to-day, disaster would terribly teach the lesson that the best is the cheapest in the end.

9. The applicatory system of instruction.

There is too little attention paid in the National Guard to field training. The course of instruction year after year is limited to close order formations, ceremonies, guard duty, and parade ground exercises. It is held that by reason of the changing personnel of the guard it is only possible to progress so far, on account of the limited time given to military duties. If this be so, then some of the parade ground evolutions should be sacrificed, and the time devoted to more practical exercises. In teaching a boy to hunt, not much time I imagine would be spent in the house or the back yard before he is taken to the fields and woods, the haunts of game. Why then in teaching young men how to fight, should they be confined to the drill hall and parade ground, instead of being taught on varied ground, such as that upon which an enemy would be encountered.

The following remarks on this subject, with schedule for a day's field exercise for a regiment are taken from the report of the Military Information Division, on the Organized Militia for 1894, and some such exercises should have a place in the instruction at every encampment.

"It is well known that realistic practical drill during time of peace, in the actual experiences of campaign and battle so far as they may be simulated without incurring death and wounds, has become the most important factor in the training of troops for war. It is only needful to point to the example of the professional soldiers of the world to show the necessity for this form of instruction, if it is desired to maintain well-trained state forces, which should be not only a defense to the states on occasions of local disturbance, but also practical schools in which many young men of coming generations may learn the real duties of troops in war, and be prepared for commissions in the volunteer forces in the event that the nation should ever again be called to arms."

"It has been observed by experienced instructors in the art of field training, that no form of military instruction requires

more careful preparation, and that whereas the benefits to be obtained by systematic and progressive field exercises are admitted by all competent authority, the reverse is true of 'sham fights,' which degenerate iuto noisy exhibitions of indiscriminate firing and impossible manœuvres. The point to be aimed at in all field training is to habituate the troops to the actual conditions of field service, that they may become expert in meeting such conditions with the least amount of unnecessary fatigue, exposure and confusion."

"Field exercises mean, in part, practice in solving the problems of the advance to the attack, with the minimum of loss in the face of a rain of lead and iron which may begin to fall when the troops are 2500 yards away from the enemy; practice in the art of marching soldiers over dusty roads and under a burning sun, and learning from experienced instructors how to save to the utmost the strength of the command. It also means practice for the commanding officers in taking up positions for defensive and offensive movements adapted to the terrain and to the object in view; and for the men, in covering the front with hasty intrenchments; practice in out-post duty, also in covering the heads of columns during an advance, with the proper feelers to give notice of the approach of an enemy, and with the proper guard to check his advance until the columns can deploy. It means going into bivouac after a march, teaching the men to put up shelter tents, and cook their own meals over camp fires, under the actual conditions of a campaign, and many other matters of a like character.

MODEL FIELD EXERCISE.

"Regiment to assemble equipped for field service, men carrying blanket roll and half shelter tents and rations for one meal. Regiment accompanied by hospital corps detachment and ambulance, and one or more wagons, loaded with mess kettles, fire wood and intrenching tools. Regiment to march covered by advance guard, for about six miles, to a position selected (hired if necessary) for a temporary bivouac. An experienced and competent instructor in the art of marching infantry with the minimum amount of fatigue and discomfort to accompany the command. Regiment to go in position and cover its front and

flanks at once by outposts established on ground previously examined by instructor. Outposts to conform to strength of command and assumed information of an enemy. Hasty intrenchments to be constructed at once (if authority of owner of land has been obtained), shelter tents to be put up; cooks, detailed from companies, to prepare dinner; outposts to be inspected and positions taken, to be commented upon by instructor. Return march taken up, covered by rear guard. Reports of outposts and advance guard commanders, and sketches of positions required in writing."

Every thought and exercise in the training of our troops should be directed to the day when they will be employed in actual war. It is a mistake to hold that war can only be learned in war. War can be learned in time of peace, and the exercises and situations can be made so real as to afford all necessary instruction.

The applicatory system of instruction is practiced in all foreign armies, its greatest scope being reached in the annual autumn manœuvres. It is this system of instruction, and this only, which enables the soldier who has never heard a hostile shot, to take the field with the coolness and confidence of the veteran of many battles.

A SYSTEM OF FIRE CONTROL AND FIRE DIRECTION FOR SEA-COAST ARTILLERY.

By First Lieut. W. C. RAFFERTY, 1st U. S. Artillery.

COAST DEFENSE.

A COAST fortress is a fortified area having land and water approaches, with the armament and personnel required for defending it from attack along these approaches. The artillery armament for defense is, as a rule, partly fixed and partly movable. The fixed armament consists of H. P. guns and mortars mounted in batteries, protected by fortifications. Some of the Q. F. batteries may form part of the fixed armament. The movable armament consists of guns, Q. F. guns and machine guns mounted on travelling carriages. They are employed at such times and places as may be deemed necessary either on the water or land front. The auxiliaries to the artillery armament are the electric search-lights and the submarine mine fields; the former are necessary for a more effective use of the artillery and submarine mines by night, and the latter either delay the enemy's ships or damage them.

"The sole test of a perfect artillery organization is the power exhibited by the defenders of any unit, whether section, battery or group to direct upon an indicated target at the shortest possible notice, a rapid, accurate and effective fire, and to maintain that fire until its object is secured."

The principles and methods laid down are intended for general application, subject to such modification in particular localities as may be deemed advantageous.

THE CHAIN OF COMMAND.

In time of war a fortress may be divided into brigade commands. A brigade command usually includes more than the defenses of the water approaches. The officer commanding is a brigade commander.

The defenses of the water approaches may be divided into certain commands, depending upon the extent of the armament. These divisions are called fire commands, and the extent of one such command is that which one officer is believed to be able to direct efficiently in action. This command gen-

erally consists of three battery groups, one or two Q. F. batteries and the electric search-lights.

A group of three or four batteries constitutes the command of a Fire Director (F. D.). The size of this command depends on the position of the batteries with respect to each other and to the area to be defended. The Q. F. guns will generally not be formed into a Fire Director's command, being, as it were, the light artillery of a Fire Commander's command and receiving their orders directly from him.

Under the Fire Director are the Battery Commanders (B. C.). For fire discipline and direction, guns are aggregated in groups called batteries, the number varying with the nature and situation of the guns. In general, two guns of ten-inch or twelve-inch calibre, three guns of eight-inch calibre, four mortars or six Q. F. guns constitute a battery. In addition to these guns a battery command includes the position finders, which are assigned to work with these guns, together with the P. F. personnel.

The chain of command, therefore, will be from the brigade commander to the fire commander, from the fire commander to the fire directors and from these to the battery commanders.

Each battery commander will generally have one or more officers as assistants, and also certain non-commissioned officers who have direct charge of the guns, and who are called gun directors.

A Fire Director's command or a battery command may be a detached unit, the commander of which will then perform the function of the higher artillery commander as well as his own.

A tactical unit may be defined as a specific detail of personnel, properly organized for fighting, together with the material to be used by it in action. A battery is the smallest tactical unit of coast artillery.

SYSTEM OF COMMUNICATIONS.

Following the chain of command, the communications will be as follows: From the Brigade Commander to the Fire Commanders, and to the mine-field station; from the Fire Commander to the Fire Directors and to the commanders of Q. F. guns and to the electric light officers and also to the ammunition

officer ; from the Fire Director to the Battery Commanders and to the P. F.'s, and from the P. F.'s to the guns.

FIGHTING STATIONS.

For Brigade Commander, a position selected at his discretion.

For the Fire Commander, a station is provided from which the water approaches can be completely observed.

For the Fire Director, a station is provided which commands a view of the water area within his zone and of the fire of his guns.

The Battery Commander will be with his battery.

The F. C. and F D. are not restricted to one point. They may use their discretion about leaving the regular station to go where their presence will prove most useful, in which case they place some suitable officer at the regular station as representative.

BRIGADE COMMANDER.

The Brigade Commander has the usual administrative staff, and such engineer, artillery and infantry assistants as circumstances may render desirable. He must inform himself as to the water and land area covered by the fire of his works and have accurate maps of both land and water approaches. He, as well as the Fire Commander, must be supplied with plates showing the character, armament and armor of the enemy's ships. He makes a general plan for the fighting of his command, and records it. He is responsible that each unit of his command is in fighting condition as to armament, ammunition and personnel. He must provide suitable means for keeping the communications in perfect working order. He will practice his commanders in the work of their commands under various probable conditions, and will cause the conclusions derived from this practice to be recorded.

FIRE COMMANDER.

The fire commander is the officer who exercises fire control, under the brigade commander: He exercises this control through the F. D.'s, the B. C.'s of Q. F. guns, and the Electric Light officers, and is in direct communication with them as well as with the brigade commander.

He is responsible for the efficiency of his command in all its

parts, so far as the artillery, personnel and material, are concerned. He must have a thorough knowledge of the zone of his command, the positions of the mine fields, the depth of water, etc. He must know the arrangements for defense against a land attack; but orders from the Bg. C. will govern his actions in general in such case.

He arranges his plan of fighting his command in advance, from a consideration of the effectiveness of the different batteries of high power guns, mortars and of Q. F. guns, and also of the character of the enemy's ships which may appear against him. His orders to his F. D.'s can therefore be given in advance; any change that may seem desirable can be made when the enemy appears.

The F. C. will have a staff composed of three officers: 1. P. F. officer; 2. Chief Am. officer; 3. Adjutant; two D. P. F. observers and such relocator operators, telephone operators, orderlies, etc., as may be required. His cell will be equipped with one or two D. P. F.'s and with a special relocator having a map of the harbor and of his zone in particular; this relocator will also show the field of fire of each battery and the effective range of the guns of each battery and prominent points. By means of this chart, used in connection with the P. F., the F. C. is able to ascertain instantly the range and azimuth of any points in the field of fire, from any gun, P. F. or other station and also the number of guns that can be brought to bear upon that point.

In general, no guns or batteries will be held as a reserve. In case the supply of ammunition is small, the expenditure may be limited, forming, as it were, an ammunition reserve.

His fire control is exercised through instructions as to targets, in advance, the concentration or dispersion of fire as circumstances may suggest, and in directing the rate of fire.

FIRE DIRECTOR.

The fire director has fire direction under the fire commander. He is in direct communication with the fire commander and with the B. C's. and P. F.'s of his command. He has a permanent command post. The position of this is such that he can see his targets and at the same time see the fire of the batteries of his command. In action he will occupy his command post unless

in his judgment his presence with some unit seems desirable. In the latter case he will leave a representative; this representative is practically an adjutant, who knows the plans of the F. D., and carries them out, and who keeps the F. D. informed of instructions and progress. His cell is equipped in a manner exactly similar to that of the F. C. The following are the duties of a F. D. in action:

He identifies the targets for the batteries of his command and transmits this identification to the P. F.'s and B. C.'s concerned.

He fixes the order of fire and the interval between shots.

He is responsible for the general discipline of his command, for the supply of ammunition in the battery magazines and for replacing casualties that may occur.

He directs the kind of projectile to be used by each battery.

He observes the fire and in case of inaccuracy he notifies the B. C.

Circumstances may make it desirable to change from the H. P. F. to the D. P. F. or *vice versa.** The water-lines of active targets may be obscured by ships of the enemy which are drifting helplessly; the upper works may be plainly visible while the water-lines are dim and indistinct; the enemy's formation for attack may render one station more desirable than two or two better than one; one station may be used for observing the effects of fire while the other obtains ranges, etc.

To change from the horizontal P. F. to the depression P. F., the F. D. directs the B. C. to make the change. The B. C. selects that D. P. F. which he considers most efficient and orders D. P. F. drill. Aiming practice at stationary and moving targets will occasionally take place with frequent changes from H. P. F. to D. P. F. In practice, when predicting at moving targets, change can be made so that consecutive observations of a series shall alternate with H. P. F. and D. P. F., each change being by order of the B. C. No time need be lost by such changes.

In case all communications of the B. C. are interrupted, he will cause the supplementary position finder to be mounted; in

* The Rafferty instrument may be used equally well either as a depression or a horizontal base range finder.

this case the communication will be oral, or it may be written by No. 2 and handed to one of the N. C. officers of each piece.

BATTERY COMMANDER.

The size of a battery command has already been stated. A battery is generally composed of guns of the same calibre, and approximately at the same height above sea level.

The B. C. is responsible that his ammunition is uniform, of the same brand or lot. He is responsible that his projectiles and all gun appliances are properly and conveniently arranged in the ammunition room. He is responsible that his guns and appliances are always ready for service.

In action his post will be with his guns and his men. His work is :— To have his guns loaded, to have the correct elevation and direction given, to have these corrected for existing conditions of powder and atmospheric condition and to fire. The officers or N. C. O.'s, working the P. F. cells attached to his battery will be under his direct command. He will frequently observe the elevation given to the guns, the progress of the work at the relocator, damage to any parts of the carriage gun or other material. He will replace men who fall out by reason of sickness, fatigue or casualty. Should anything be out of order to such an extent as to prevent the working of a particular gun, he will report it to the F. D. He will observe the effect of his fire by means of his gun trainers, who will report to him after each fire and in case he is assured that it is ineffective, he will endeavor to discover the cause. One lieutenant will act as battery armament officer and one as ammunition officer and P. F. officer; both will be general assistants in action. The N. C. O. in charge of the ammunition and the N. C. O. at P. F. cells and at relocator will be under the supervision of this latter officer, who is called Battery P. F. officer. The battery P. F. officer has charge of P. F. instruction under the B. C. and of the instruments. Uniformity of instruction will be secured by the constant supervision and inspection by the P. F. officer who is on the staff of the F. D.

He is responsible for the drill and discipline of his men, for the proper service and firing of his guns, and no gun will be

fired except by his orders. He is in direct communication with the F. D. and with his P. F. cells.

GUN DIRECTORS.

The gun director commands the gun and is responsible to the B. C. for the regular and efficient service of the gun in all respects. He is responsible that the laying and training of the gun are as ordered by him. He superintends the work of the numbers at the relocator and deviation index, he reads the elevation and azimuth on the relocator and applies to these the corrections given to him from the D. I. and gives the corrected elevation and corrected azimuth to the gun layer and the gun trainer respectively. He frequently examines the elevation and training of the gun in order to insure accuracy. The gun director is charged with the care of the gun, its condition, ease of action, cleanliness of all its parts. Also, under the ammunition officer he is charged with having all the ammunition of his gun in its proper place, as well as all the appliances.

The gun layer gives the elevation to the gun.

The gun trainer gives the direction to the gun.

In case of casualty the regular succession in command at the gun is gun director, gun layer, gun trainer. As soon as a gun is properly laid and trained, the gun trainer mounts quickly on the observation step. This is his "firing post"; he goes there as a signal to the B. C. that the gun is ready for fire and also to observe the effect of the fire.

ELEVATION AND DIRECTION OF GUNS.

The elevation of the gun is indicated by a graduated arc and a pointer, provided for that purpose on the gun and carriage. This elevation is quadrant elevation, or the angle made by the axis of the bore with the horizontal; the tabular elevation for a given range must be corrected for the height of the trunnions above the target. This method of indicating elevation is the one generally to be employed with the H. P. guns and mortars.

Sight elevation is the angle made by the axis of the gun with the line of sight. This is indicated by a graduated arc and pointer on the sight. When using sight elevation, the sight is set so as to indicate the tabular elevation for the range, regard-

less of the difference in level between the gun and target. This method is used with Q. F. guns.

Laying a gun means giving it the elevation.

In using quadrant elevation, the correctness of the elevation given to the gun depends upon the level of the traverse circle. To correct for this, a quadrant is attached to the gun or carriage on a shelf especially prepared for it; by traversing the gun through its range of direction, the variations at different directions are found. Should the variation be slight, the pointer which marks the elevation on the arc above referred to is adjusted to a mean position. In some cases it may be desirable to allow for the variation by adding it to the elevation or subtracting it from the elevation; in such cases the pointer will be set so as to read zero at the lowest or highest point of the traverse circle; then the corrections will be all plus or all minus.

The elevation of a mortar is a duplex quantity; it includes the charge of powder and the elevation for the range with that charge. Both must generally be known together; the proper charge is then inserted in the gun and the corresponding elevation for the range is given.

Direction or training. The direction of a gun is indicated on a graduated traverse circle by a pointer attached to the carriage. The graduations on all traverse circles are so placed that a pointer on the traverse may be set to indicate zero when the muzzle points South. The graduations increase as the muzzle turns towards the West. H. P. guns and mortars have traverse circles so graduated that the direction may be read to 3 minutes of arc or less; direction or training is generally given in this manner. With Q. F. guns the sight gives the direction. Training a gun is giving it the direction.

The method of giving elevation and direction without the sight is called the indirect method of laying a gun. The method which involves the use of a sight is called the direct method. The two methods may be combined, the elevation being given by quadrant or arc and the direction by sight.

MATERIAL.

Range Finders.—It is assumed that the following instruments are supplied for use in the artillery service.

1. Rafferty Horizontal Position Finder and Relocator.
2. Rafferty Depression Position Finder.
3. Rafferty Relocator.
4. Rafferty Deviation Index.

The H. P. F. & R. of a battery consists of 2 D. P. F.'s in cells at the ends of a measured base line, a relocator at each gun of the battery and the lines connecting them electrically. The azimuths taken simultaneously at the two D. P, F.'s are known at all the guns, and at each one they are converted into the elevation and direction necessary to be used by that particular gun.

The D. P. F. consists of a telescope mounted on a plane table or azimuth circle, so as to have movement in a vertical plane as well as in a horizontal plane. The azimuth circle is firmly attached to a pedestal which is permanently in place. The vertical movement of the telescope is converted into yards of range ; its horizontal position with respect to the North and South line is indicated in degrees and minutes. The adjustments of the D. P. F. require that the following information should be recorded on the pedestals :

1. Training and range of datum points.
2. Height of instrument above mean tide.
3. Rise and fall of tide.

The Relocator is an instrument which solves triangles mechanically in a few seconds. The following are some of the solutions made use of in the artillery service :

Knowing the range and azimuth from one point, to obtain the range and azimuth from a second known point :

Knowing the range and azimuth from one point, to find the ranges and azimuths from two other known points :

Knowing the azimuths from two points of a known base to an object, to obtain the range and azimuth from any third known point :

Knowing the range and azimuth from one point, to obtain the ranges and azimuths from any number of known points, and also the converse of this.

For the use of the F. C. and F. D., the relocator contains an outline map of the water area and shows the fields of fire of the various batteries and guns, and their range limits, and constitutes the Fire Commander's chart or the Fire Director's chart.

For the use of the B. C., the relocators are furnished with adjustable elevation scales for different I. V.'s, so that all books, range tables, etc., are dispensed with. When used by the B. C. as an H. P. F., the third problem is solved; when used by the B. C. in connection with D. P. F. the first problem is solved. When used by the F. C. or F. D. the second and fourth problems are solved; these problems generally refer to the subject of target identification.

The Deviation Index is an instrument which obtains mechanically the corrections due to wind, atmosphere and drift, in minutes of direction and minutes of elevation. It can be set in advance for the known conditions of atmosphere and wind, and it is then ready for any target; the range and azimuth of the latter will then determine the corrections.

MANUAL AT D. P. F. CELL.

As H. P. F.—No. 1 works the instrument; No. 2 attends the telephone, keeping a head receiver on at all times. No. 2 receives from the F. D. the azimuth and range of the target for identification, calls it to No. 1 and writes it. No. 1 sets his instrument accordingly and having found the target calls "O. K."; No. 2 then telephones "Station (A) Target O. K." No. 1 then follows the target, keeping the vertical hair of the telescope on the funnel or other point of the target as directed by the B. C.; he and No. 2 await further orders from the B. C. When both stations call station (—) Target O. K., it is heard at the gun and the B. C. is notified. At the command "1–2 take" sent from the battery, and repeated by No. 2, No. 1 stops and reads the angle which is to be transmitted, calls it to No. 2, who calls "A" (or "B") and the angle through the telephone. No. 1 picks up the vessel again; at each command "1–2 take" this is done until the B. C. directs "rest."

One D. P. F. used with relocator. The drill is the same as above, except that at "take" both the range and azimuth are read and transmitted.

Relocator near gun for use of B. C. as H. P. F. Three numbers.

No. 1 operates the A arm; No. 2 the B arm; No. 3 the spacer and gun pin.

The spacer is habitually on the board between the arms, the base being parallel to one arm to prevent jamming. No. 3 carries the gun pin in his right hand.

The telephone man calls the azimuths which are sent to him from the base stations, "A" and "B": when he calls "A" (so many degrees and minutes), No. 1 sets the A arm and calls "set"; at "B" (so many degrees and minutes) No. 2 sets the B arm and calls "set"; Nos. 1 and 2 press their ends firmly down. No. 3 moves the spacer with both hands towards the pivot, keeping one edge in touch with one arm and preserving parallelism; as soon as he obtains contact on both edges and parallelism, he calls "set"; Nos. 1 and 2 remove their respective arms; No. 3 places the gun pin; removes the spacer and brings one arm to contact with the gun pin, he then reads the range and azimuth, or the elevation and azimuth as the case may be. If used with mortars instead of the elevation alone, the elevation scale indicates both the charge to be used and the elevation for that charge. The elevation scale also gives the time of flight. Instead of the telephone, other means may be employed for transmitting the angles to the guns. All electrical communication will be considered in a separate chapter.

Relocator near gun used with one D. P. F.

(a) One operator. Hold the R. F. arm with the left hand, the spacer in the right, its handle between the thumb and the first and second fingers. When the azimuth and range are called out, he sets the arm at the azimuth; then, resting the right hand and little finger on the board, he slides the spacer along the arm (the pin being off the board) to the range, the spacer being nearly perpendicular to the arm; when just right, place the spacer on the board, transfer the left hand to the spacer, then, with the right, secure parallelism of the spacer and bring the gun arm to contact.

(b) Two operators. No. 1 operates the R. F. arm; No. 2 operates the spacer and the gun arm.

The telephone boxes and the relocator are in close proximity. The telephone operator at the right gun of each battery is provided with a stop watch and keeps time for the P. F. S. when prediction is used. The B. C. details one man as timer for the battery; the timer keeps the time for the

B. C. and for the telephone men at the relocators; in the former case he notifies the battery commander at intervals as directed by the B. C. These intervals will refer to the time between shots or salvoes, or to the time for firing the battery or particular guns at predicted positions of the target.

In firing at a moving target prediction must be employed. The essential element of prediction is time; the object of prediction being to obtain the position of a moving target in advance of the present known position and lay and train the gun on predicted position. The prediction is accomplished on the the relocator at each gun. To obtain the predicted position two consecutive observations taken at a known interval are plotted on the relocator (interval to be from 15 to 30 seconds) and by means of a proportional scale, a point is obtained in advance of these two plotted positions and at a distance from the second equal to treble the first interval. This predicted point will therefore be the position of the target at the end of one minute or 2 minutes, according to the time interval employed. From the relocator, the G. D. reads the elevation and direction of the predicted point, corrects them as indicated by the D. I., gives the corrected data to the the gun layer and the gun trainer, respectively, and calls the time of flight to the B. C. timer. Habitually the fire of a battery at a moving target will be by salvo. After the first fire the stop-watches are brought to zero again and the battery timer indicates the beginning of the observations for the next prediction, and so on. Thus the B. C. holds his battery and its fire in hand at all times.

The essential element in maintaining a sustained fire is time; the F. D. maintains a sustained fire to suit his plans by directing what shall be the interval in time between shots or salvoes. For illustration, he directs one battery of his command to fire at the given target two-minute salvoes; the B. C. upon receipt of the order must prepare for the first fire, directing his timer to notify him at the end of each two minutes less the time of flight; the first salvo would be fired after about two minutes, the next about two minutes later, etc. If the F. D. desires to fire more slowly, he might direct three-minute intervals, or he might direct a definite number of shots or salvoes at a given interval.

As the F. C. controls the fire, the F. D. will be governed as to the intervals by instructions received from the F. C.

Relocator in F. C. Cell, as F. C. Chart.

The Cell has also one D. P. F.

The relocator has an outline map of the harbor and prominent points marked on it. The fields of fire of the different batteries are indicated.

The F. C. having located the ships to be fought by his command desires to know first how many batteries can be brought to bear on each ship; he points out one ship to the D. P. F. observer who takes the range and azimuth of it and calls them to the relocator detachment, which consists of three men. No. 1 sets his arm at the given azimuth; No. 3 takes the proper spacer, which in this case has the position of each battery or of each gun with respect to the F. C. station, marked upon it, sets it so that the F. C. point will be at the given range on No. 1's arm and secures parallelism; the position of each station or gun with respect to the fields of fire on the chart, show at a glance what guns can bear on that ship. The same operation gives similar information in regard to other ships when the azimuth and range of the latter are known.

To identify different ships from the F. D.'s the same means and operation are employed, except that No. 3 takes up the spacer for each particular F. D. as directed by the F. C.

The F. D. chart is operated in exactly the same manner. The F. D. directs his P. F. observer to obtain the range and azimuth of a designated ship; this is called to the relocator operators who use the spacer appertaining to the battery directed. They obtain the ranges and azimuths from the two P. F. stations and transmit them to the operators in those cells. As soon as both have replied "station (—) target O. K." the F. D. is informed and proceeds to assign another target. It may be that all the batteries in the F. D. command will fire at a single ship. In such case the operation will be the same, except that three different spacers for three batteries would be used consecutively, No. 1 setting his arm only once.

On account of smoke or atmospheric conditions such as mists, it will frequently happen that the D. P. F. operator is unable to make out the water line, while the upper works are

visible; under these circumstances the P. F. operator in the F. C. cell or in the F. D. cell will use his judgment and estimate as nearly as possible the water line.

As a general rule an H. P. F. will be used at ranges above 4000 yards; if the height be less than fifty feet, the H. P. F. will be used at ranges down to 2000 yards; when in the opinion of the B. C. or F. D., the circumstances are such as to justify the use of the D. P. F. and R., or of the D. P. F. alone, he will so direct.

(*To be continued.*)

PREPARATION OF A REGIMENT OF VOLUNTEERS FOR FIELD SERVICE.

By Captain F. F. EASTMAN, 14th U. S. Infantry.

ANY officer below the rank of colonel may, at any time, be called upon to take part in preparing a volunteer regiment for the field and it is well to be prepared for the duty.

In dealing with my subject, I shall do so under the following heads: 1st, Organization; 2d, Administration; 3d, Drill and Target Practice; and 4th, Discipline.

ORGANIZATION.

The regulations governing the organization of volunteers during the Civil War are found in various orders issued from the Adjutant General's office from 1861 to 1864.

General Orders No. 15 of 1861 was the first issued. In that order it was prescribed that the minimum aggregate strength of a company of infantry should be 83 men, organized as follows: one captain, one 1st lieutenant, one 2d lieutenant, one 1st sergeant, four sergeants, eight corporals, two musicians, one wagoner and 64 privates; aggregate 83. This was the minimum. Eighteen privates might be enlisted, making the maximum strength 101.

The minimum strength of the infantry regiment was fixed at 830 company officers and enlisted men; one colonel, one lieutenant-colonel, one major, one adjutant (lieutenat.), one regimental Q. M. (lieutenant), one assistant surgeon, one sergeant-

major, one regimental Q. M. sergeant, one regimental comissary sergeant, one hospital steward, two principal musicians, and twenty-four musicians of the band: aggregate 866. The maximum aggregate strength was fixed at 1046.

The field and company officers were to be appointed by the Governors of the several States. One chaplain was to be appointed by the regimental commander on selection by vote of the field officers and company commanders. He had to be a regularly ordained minister of some Christian denomination.

Two-thirds of the company officers were to be appointed at the commencement of the organization of the regiment, and the remaining third were to be appointed from the sergeants on recommendation of the colonel, approved by the brigade commander, when the regiment had its full complement of men. Vacancies occurring subsequently, one-half of the same in the lowest grade were to be filled from the ranks.

G. O. 25 of '61 added one surgeon to each regiment, and the medical officers were to be examined by a medical board, and the appointments were subject to approval by the Secretary of War.

G. O. 45 of '61 directed that the Governors of the States were to make appointments to fill vacancies among the officers in regiments from their respective states.

G. O. 47 of '61 directed that all officers of volunteer regiments were to be subject to examination by board appointed by the War Department, with concurrence of the General-in-chief, as to their fitness for the positions they held. Officers found incompetent were to be rejected, and vacancies thus occasioned were to be filled by appointment from such as had passed such examination. This order was subsequently revoked by G. O. 55 of '61.

G. O. 49 of '61 published Act of Congress, approved July 22, 1861. Section 4 of that Act provided that the Governors of the States furnishing volunteers under that act were to commission the field, staff, and company officers of their volunteer regiments. If State authorities refused, or omitted, to furnish volunteers, and volunteers offered their services, the President was to commission their officers.

Section 10 of the same act provided for examination of cer-

tain volunteer officers under certain conditions. If found deficient, their commissions were vacated on approval by the President. Under the same section 10, vacancies among company officers were to be filled by election by vote of the men of the respective companies. Field officers were to be elected by the commissioned officers of the regiment. The officers so selected were to be commissioned by the Governors of the States or by the President.

G. O. 54 published Act of Congress approved August 6, 1861. Under the provisions of said Act, vacancies occurring among commissioned officers in volunteer regiments were to be filled by Governors of States in the same manner as original vacancies. Section 10 of Act of July 22, 1861, prescribing elections, etc., was repealed.

By G. O. 58 of '61, recruiting officers of volunteers were authorized to muster in volunteers as fast as enrolled.

G. O. 61 of '61 prescribed that only officers already mustered into service could muster in recruits; and only civil magistrate, or regular army officer, could administer the oath of allegiance.

When one-half the company had been mustered, the 1st lieutenant was to be mustered in; and when the full complement of the company was obtained, the captain and 2d lieutenant were to be mustered in.

The lieutenant-colonel was to be mustered in on completion of four companies, the major after six companies, and the colonel and staff after the entire regiment was completed.

By G. O. 78 of '61, all persons authorized by the War Department to raise regiments and companies were, with their commands, placed under orders of the Governors of the States to be organized and prepared for service by the Governors according to their judgment. The regimental staff and medical officers could also be mustered in to assist in recruiting the regiment.

G. O. 18 of '62 repeated that the Governors of States were legally the authorities for raising volunteer regiments and commissioning officers of the same.

Under the provisions of G. O. 75 of '62 a volunteer regiment, as soon as complete, was to be carefully inspected by mustering

officer of that State. All except sick in hospital were required to be present.

Regiments until completely organized and mustered in were placed under the exclusive control of the Governors.

Under the provisions of G. O. 107 of '62, officers of the regular army could receive leave of absence to accept rank of colonel of volunteers, but of no lower grade.

G. O. 126 of '62 added one assistant surgeon to the regimental organization, and directed the muster out of the Bands.

ADMINISTRATION.

The term means in military affairs, the execution of the duties of an office.

The regiment is an administrative unit, but as the colonel of a regiment cannot personally attend to the individual needs, drill and discipline of a 1000 or 1200 men, the company is also made an administrative unit.

When he is not also post commander, the administrative duties of the commander of a regiment are principally supervisory in their nature. He must see that the company commanders ask for, and obtain, the necessary arms, ammunition, rations, clothing, camp and garrison equipage, and that the necessary transportation is furnished for such supplies as the men cannot themselves carry. He is responsible for the theoretical and practical instruction of his officers, and that the companies of his regiment are efficient. In the matter of discipline, he is charged with the duty of supporting his subordinates in their proper efforts to increase the efficiency of their companies and in trying to establish and maintain good discipline. He is also especially charged with the duty of seeing that "military authority exercised by himself and his subordinates shall be exercised with firmness, kindness and justice; that punishments shall conform to law, and follow offenses as promptly as circumstances will permit." (Par. 2, A. R. of '95.)

During the Rebellion, the U. S. Mustering and Disbursing officers were charged with furnishing subsistence both prior and subsequent to muster. (G. O. 91 of '61.)

Requisitions for blanks were to be made on the Adjutant General of the State. (G. O. 13 of '62.)

All requisitions for quartermaster, medical and ordnance stores, and all contracts for subsistence, were to be approved by the Governor of the State, or they would not be supplied or allowed. When desired by the Governors the U. S. officers were authorized to turn over quartermaster, medical and ordnance supplies to the State authorities to be issued and accounted for by them. (G. O. 75 of '62.)

Under the provisions of G. O. 131 of '64, all requisitions for quartermaster, medical and ordnance stores, all contracts for fuel, forage, straw, subsistence, and requisitions for transportation, were to be approved by the Superintendent of Volunteer Recruiting Service for the State or Division. No vouchers would be paid for same unless so approved.

Now as I claim to be competent to say what would be the best way to prepare volunteers for field service in all cases, and, as no two officers could or would follow the same system, I must limit the application of what is to follow in this article to what I would personally try to do if I were detailed for such duty. I make this statement as an apology for the frequent use of the personal pronoun I.

The regiment being organized, the first administrative duty of the regimental commander would be to make arrangements, if not already made, for feeding his command: the next, to secure arms, ammunition, clothing, camp equipage, books, stationery, etc.

To save time, I would personally make requisition for the above-mentioned supplies.

At the earliest practicable moment the adjutant, quartermaster and company commanders must be instructed to keep the necessary data for the morning reports, sick-books, rosters, other record books, reports, returns and rolls, so that on receipt and issue of the books and blanks, the records of the regiment and companies can be made full, complete and accurate from date of organization.

On receipt of the blanks, I would instruct the adjutant, quartermaster and company commanders how to make out the necessary requisitions, and then turn over to them all supplies as soon as received by me. The notes and directions on the blanks are so full and explicit that but little instruction would be

necessary. The forms of military correspondence would be learned from day to day.

Company commanders should be called together to study the paragraphs of the Regulations which prescribe their administrative duties. In consequence of their personal liability in everything concerning the clothing accounts and pay of the men of their companies, company commanders should themselves, for a time at least, make all entries and computations in the Company Clothing book, and keep all data affecting their pay.

I should immediately issue the necessary sanitary rules and regulations, and see that they were rigidly enforced at all times by every one under my command. To prevent sickness, the coöperation of the officers must be secured in trying to impress upon the men the importance of keeping the camp and its vicinity as clean as possible. The necessity of personal cleanliness must be urged, and company commanders should not allow their men to wear ragged and dirty clothing so long as the cloth is strong enough to be sewed together and soap can be obtained with which to wash themselves and their clothing. Sailors always do their own washing and mending, and soldiers, when in the field, should be required from the first day to do the same.

In the preparation of troops for the field during the Rebellion, volunteers were often required to drill eight hours per day. It is important under such circumstances that men be kept very busy to prevent homesickness and discontent sure to result from idleness. When not at drill or other duty, athletic games of all kinds, and other proper amusements, should be encouraged.

DRILL.

I assume the most unfavorable conditions: a regiment of men who have received no military training whatever.

It is unquestionably a great advantage to officers to have had experience in all grades. Therefore, as a first step toward the preparation of a regiment for field service, I would personally drill my officers and sergeants in the Schools of the Soldier, squad, platoon and company, in both close and extended order.

In the school of the soldier, close order, the correct positions of the man should be explained, then the rests, facings, and salutes. The setting-up exercises might be postponed until a

more convenient season as not being of immediate importance. The steps must be briefly explained, and executed. I would also drill officers in the squad drill, not devoting much time to the alignments.

After the squad drill, I would drill my officers and sergeants as a provisional company, paying but little attention to the marchings in line.

I would then drill this provisional company in the march in columns of platoons, in the changes from the same to column of fours, and in formation of lines of columns of fours. Nearly all the squad drill of the extended order could be executed by each squad or four of the company while in column of fours, if the distances be increased somewhat.

I would then drill the company as a platoon in extended order. The company extended order, being more especially a drill for officers and chiefs of section, I would postpone such drill until a fair degree of efficiency were attained in the preceding drills.

On receipt of arms I would order each company commander to select a suitable man, a gunsmith or machinist preferred, to report to me for instruction in the mechanism and proper care of the rifle. The men so selected would then instruct the officers and chiefs of squads. These latter, under the supervision of the company officers, would instruct the men of their respective squads.

Next I would drill the company in the absolutely essential portions of the manual of arms, but without trying to secure any cadence. By paying particular attention to the handling of the pieces in loading and firing in the squad, platoon and company firings, probable accidents may be avoided.

As fast as the captains understood parts of the various drills, I would require them to impart the same instruction to their companies, cautioning them not to attempt anything they did not thoroughly understand.

The companies having become partially familiar with the company movements, battalion drill could be instituted. I should drill each battalion, requiring the battalion commanders to be present so they might get an idea how each movement must be executed. Except the formation of column of platoons

from column of fours and the reverse, all platoon movements might well be omitted. All changes from column of companies into line, and the reverse, should be omitted ; also the change of front as prescribed in paragraph 315, Drill Regulations.

In the regimental drill, I would drill it in the formation of the regiment and in those movements which can be simultaneously executed by the battalions, companies or platoons. I would omit all other successive formations, except the order in echelon. Of course evolutions of the regiment are necessary, but the simplest way is to direct a major to move and form his battalion so and so with reference to such and such a battalion.

The battalion extended order drill is very important because the battalion is the fighting unit; but the normal order of our drill book is best observed by departing from it. As a rule platoons should be used intact, each under its chief, and often in battalion extended order, entire companies can be used with more effect than by detachments. I should give my company commanders every opportunity to learn how to use the formation best adapted to the topography and the conditions of the engagement.

It is to be remembered that tactical movements, and the language of the drill books, are not easily understood by persons who have never drilled or seen soldiers drilled. Hence, if officers were drilled before beginning their study of the drill regulations, such practice would prove of great assistance to them in understanding the same.

Instruction in Guard Duty is important. It is a duty which should be attended to by the officers of each company, and should be commenced even before arms are issued. Each squad may be divided into reliefs, and the reliefs posted in turn as sentinels. Each sentinel ought to be visited and questioned by his company officers, and the instruction continued from day to day until all are proficient. All General Orders of the Manual of Guard Duty should be committed to memory: the Special Orders, being subject to frequent change, should be given the sentinels by the officers and non-commissioned officers of the post guard.

TARGET PRACTICE.

There would probably be but little time for target practice,

but it is of great importance that each man should have some practice. Therefore, as soon as the men had been instructed in the mechanism of their rifles, and had received a few drills in the pointing, aiming and position drills, I should order target practice in the prone position at 300 yards to teach them the most important position first, and give each man practice at a range where the extraneous conditions would have but little effec on his shooting. This would give confidence in the rifle. There is nothing, in my opinion, which adds more to to the *morale* of a soldier than confidence in the accuracy of his weapon, andt when he becomes also confident in his own skill, he is (other things being equal) an efficient fighting unit.

Having had a few days of practice in the prone position at 300 yards, I should have practice at 600 yards, to show the effect of extraneous conditions. Practice at other known ranges and in other positions, I would dispense with unless there were plenty of time.

Next would come skirmish firing if at all practicable. The more of it the better. Practice at the figure targets would accustom the men to the appearance of the enemy in the corresponding positions, and the practice at the figures at unknown distances beyond 600 yards would tend to add to the *morale* by showing the small chance of being hit by the aimed fire at the long ranges.

PRACTICE MARCHES.

If possible, I would take my command, or portions of it at a time, on a practice march of three or four or more days duration. The matter of primary importance on such a march is teaching the men to take proper care of their feet; to properly adjust their accoutrements; to teach them to be careful about drinking too much water and eating while on the march.

If possible the camping place should be selected before the arrival of the troops, so that they may not become stiff and sore while waiting. The camp being reached, wood and water must be procured, and the cook's fire started with the least possible delay.

In camp men should be required to construct sinks and proper shelter to secure some degree of privacy, and they should

be impressed with the necessity of the greatest cleanliness both of the person and of the camp and vicinity. The cooks learn to cook over camp fires and without the conveniences of the kitchen range, how to care for the rations, and how to utilize them to the best advantage. Several days rations should be issued to the men, and each be required to prepare his own meal so far as it is practicable for him to do so. Potatoes baked in the ashes are much better than potatoes boiled, and men soon learn to make their own coffee. Hard bread fried in grease is often more palatable than hard bread dry.

On reaching camp tents must be properly and rapidly pitched, and men must learn how to best utilize tent space.

Two or more picked men, one of them being a non-commissioned officer if possible, should be detailed to learn to properly load the company baggage on its wagon.

Camp should be promptly broken, and everything loaded rapidly and in perfect order. The general having been sounded, the assemby should be sounded always after a fixed time has elapsed. This interval must be long enough to enable the men and details, working rapidly, to strike and pack the tents, roll their blankets and prepare their packs. The cooks should certainly have time to wash their utensils, pack them, and allow the fire-irons to cool off in order that they may be loaded without danger of setting a wagon on fire.

In marching out of camp, each company should take its place in the column with the least possible marching. The 300 or 400 yards sometimes needlessly added to a long, hard march materially increase the fatigue incident thereto.

I see nothing to be gained in a practice march by a long march, and needless suffering from sore and blistered feet can in no way add to the efficiency of troops. A forced march requires the attainment of some definite object of some importance to justify it.

During a practice march, officers and men can be instructed to best advantage in outpost and advance guard duty, especially if practicable to pit one battalion against another. The same is true as to instruction in the duties of patrols, reconnoitring parties, and in fact to all the problems of minor tactics. To approach the realism of actual war service, sentinels must have

something to watch for, and patrols must have somebody or something to hunt for. Patrol, picket and outpost commanders should have the movements of persons or things to report. Reports of imaginary men in imaginary places under imaginary conditions are uninteresting, unprofitable to everybody, and in most cases are absurd as well.

After a march of ten miles, patrols and topographical reconnoitring parties can be sent out, and on their return, sketches and reports may be required. The men in camp will have time to bathe and wash their clothes, may be able to secure straw, grass, leaves or boughs with which to make themselves comfortable for the night, and the details for outpost duty for the coming night will be able to secure sleep and rest before marching on. The cooks will also have time to bake bread for the next day or two.

DISCIPLINE.

To establish discipline in a regiment of volunteers requires different methods from those used in the regular army. In the latter case a few recruits enter at a time, and they accept control from the first as a matter of course because their comrades do so. In a short time such recruits fall into the routine, and by the time they have received a fair degree of instruction in the numerous duties of soldiers, their discipline is fairly well established.

On the formation of a regiment of volunteers, the conditions are entirely different. All are alike ignorant of their duties as soldiers and of the necessity of discipline. Nearly all would have a love of order and justice and a natural respect for law; but, at the same time, all would be American citizens, and as such each man would consider himself as good as any other man, officer or private. It seems to me it would be specially difficult to reconcile volunteers to performing certain duties which, at first blush, seem to be of a menial nature, such as digging sinks for the officers, putting up their tents, gathering up and carting off camp refuse, etc.

Under such conditions, great caution and as much tact as the colonel may possess, should be exercised in taking the first steps to bring the men and officers to a correct appreciation of

their proper and legitimate relations to one another. A grave infraction of discipline may be pardoned at the first with an explanation of the serious military nature of the offense, followed by an earnest warning of the severe punishment sure to ensue on a repetition of the same.

Wagner truly says: "With intelligent and zealous volunteers, discipline becomes mainly a matter of instruction and guidance." This being true, the first thing to be ordered by the commander of a new regiment on assuming command, would be the reading of the Articles of War and Article I of Army Regulations, calling special attention to Articles of War as follows: Articles 20–25, 31–40, 48, 54, 55, 58, 61, and 62.

Drilling the officers as a provisional company would, I think, be very effective in establishing discipline, as after seeing their officers readily subjecting themselves to control, the men would naturally be more willing to follow their example. Thus by first requiring from the officers a strict compliance with the requirements of military discipline, I believe the men may soon be brought to a proper and willing submission to the same.

But to make a regiment truly efficient, I should consider it necessary to make clear to the battalion and company commanders the duties and especially the responsibilities of their grades. Wagner says: "The most efficient armies are those in which the captains are given the greatest latitude in the methods of instructing and providing for their companies and held to the most rigid accountability for their good condition and military efficiency." I believe every word of the quotation to be true. While the commander of the regiment must be the one to establish his own standard of drill and efficiency, the captains ought to be permitted to raise their units, without interference, if they can, to the required standard.

No company can be efficient and well disciplined unless it have zealous and well instructed non-commissioned officers. They cannot be efficient unless they are in the habit of commanding and are accustomed to being obeyed. The latter remark applies to the subalterns also. I would therefore, caution captains not to do the work of their lieutenants and non-commissioned officers, and I would expect them to require not only their lieutenants but also their sergeants to drill the company.

Zeal in a proper discharge of duty is to be encouraged and expected from all grades, but zeal may be easily converted into an indifferent and perfunctory performance of duty by a lack of support or a meddlesome interference in matters of small importance.

In conclusion I would urge upon all the importance of the subject of the preparation of volunteers for field service in war. If war should come suddenly upon us, and from 300,000 to 500,000 men be called into service, it is manifest that the regiments must be fitted for the field in the least possible time. Therefore, as many officers would be detailed for such duty, it would be of great advantage to the country if each and every army officer would devote much thought to the subject, and each formulate as far as possible, the methods he would pursue in the execution of his task.

Reprints and Translations.

"TACTICAL APPLICATION OF FIELD DEFENSES IN BATTLES OF RECENT CAMPAIGNS."

By Lieutenant-Colonel M. H. G. GOLDIE, R. E.

(*From Papers of the Aldershot Military Society.*)

THE subject of this lecture is the use of field defenses in battle. I shall attempt to show, by illustration from recent battles, that where field defenses have been used on correct tactical principles, great results have followed; and that where such principles have been neglected, the results have been bad: it has even happened, in such cases, that the whole advantage of the field defenses has passed to the other side.

These battles have been so often described that it is unnecessary to do more than draw attention to such facts and deductions as help to make the argument clear. Description to that extent is unavoidable; as also is a little criticism.

The first illustration is taken from the

BATTLE ON THE LISAINE

fought in January, 1871, during the Franco-German War.

It will be shown that in this battle field defenses were used along the front of a position, so that men might be withdrawn to form strong reserves at the disposal of the commander. These reserves reinforced seriously threatened points, the reinforcements rejoining the reserve as soon as possible. Then, later, the reserves were used to meet a turning movement, and thus secure a victory.

The third German covering army had for its primary duties the protection of the great line of communications, and to cover the siege of Belfort.

Compelled to retire eastward before the superior forces of Bourbaki and Garibaldi, von Werder resolved to accept battle in a position on the Lisaine. He received instructions in this sense from headquarters. A further retirement would have implied the abandonment of the siege of Belfort, and the siege material there collected.

Belfort is approached from the west by two lines of railway. The northern line had been torn up in several places, but the southern, by Montbeliard, was in working order. Of the three roads from the west to Belfort, the strong castle of Montbeliard commanded one; the hill called Mont Mougnot, west of the Lisaine, commanded that by Héricourt; the northern road lay open. Hence, to cover Belfort, Werder thought it necessary to take up a position extending from Montbeliard

to Frahier, a distance of 11½ miles. For this purpose he had at his disposal about 45,000 men and 146 guns.

In considering how he should post this force, von Werder bore in mind the following points:—

(1) The enemy, though in numbers twice as strong as he, was entirely deficient of transport, and, therefore, dependent for supplies on the southern railroad.

(2) Above Chenebier the Lisaine is of no importance; thence to Montbeliard the river is from 20 to 25 feet broad, and from 20 to 40 inches deep. In places dams had been thrown across. Hence south of Chenebier the river is itself a fair obstacle.

(3) South of Hericourt the railway embankment forms a second defensible obstacle.

(4) The country generally is much wooded. This gives an attacking force the advantage of cover; but it impedes deployments, limits the choice of artillery positions, and, since at this time ice and snow rendered the paths unusually difficult, hindered rapid marching on particular points.

(5) The lower part of the Lisaine Valley is commanded from the eastern heights, as Mont Vaudois and Le Grange Dame. The upper part has gentle slopes, except about Chagey, where a force might reassemble for a fresh advance.

(6) Considering the great extent of the position, lateral communications would have been extremely valuable: hardly any existed.

Proceeding, then, as if he expected the main attack on his left and centre, von Werder posted the bulk of his forces on that side, entrusting the defense of his right to strong detachments. He determined also to throw up field defenses at various points and to form two strong, carefully-placed reserves.

Accordingly, we find the extreme left protected by outposts. At Montbeliard and Hericourt great artillery positions were formed; and here also strong bodies of troops were massed. Strong detachments were posted at such intermediate points as Bethoncourt and Bussurel. The right, from Chagey to Frahier, was held entirely by detachments, with outposts as far as Ronchamp. A large number of siege guns were available; nearly all these were placed on the left and centre, as, for instance, seven at Mont Vaudois, five at La Grange Dame, and six at Montebeliard castle.

To make of the Lisaine an effective obstacle the ice was broken as far as possible: the railway embankment also came in usefully. The field-guns were, generally speaking, provided with emplacements, particular care being taken on this point at Mont Mougnot. Shelter trenches with wire entanglements were formed at Bethoncourt, Hericourt, Luze, and Chagey: those at Mont Mougnot were in two tiers. At Hericourt woods were cut down, and abattis formed, roads were barricaded, and the town arranged for defense. At Brevilliers was posted a reserve of

eight-and-a-quarter battalions, six squadrons, and five batteries; at Charmont a reserve of six battalions, one squadron, and two batteries.

In spite of his dependence on the southern railway, General Bourbaki had determined to engage the Germans all along their line, while a special force attempted to turn their right. On the 14th January the 15th, 20th, and 24th French corps were closely concentrated on a front of 4½ miles on the line Dung-Aibre-le Vernois. The 18th corps was to northward and considerably to the rear, with Cremer's division still further to the rear. A change of front was therefore ordered to enable the 15th corps to attack at Montbeliard, the 20th corps at Hericourt, and the 24th corps between those two points. At the same time the 18th corps was to cross the Lisaine at Chagey, and advance on a point between Hericourt and Mandrevillars, while the division Cremer crossed above Chagey and marched direct on Mandrevillars. All corps were to allow time for this turning movement, and then the guns of the 15th corps were to be the signal for attack.

It may be inferred that, owing to bad information, the German right was supposed to be at Mont Vaudois; also that the marching power of the 18th corps and division Cremer—very bad owing to the slippery state of the roads—was much overrated, while the impatience of the corps on the right was underrated. In consequence, on the 15th, Werder was heavily attacked on the left, and cannonaded in the centre, while the 18th corps was checked at Chagey. Cremer meantime got as far as Etobon.

On this date the use made of the reserves was as follows:—At 4 P. M. two battalions and two batteries reinforced at Bussurel, and were retained there till 9.30 P. M., when they rejoined the main reserve. At 5 P. M. the Fusilier battalion and 7th company of the 6th Baden regiment, with eight guns, were sent from the main reserve to Chagey to reinforce the detachment opposing the advance of the 18th French corps. As this reinforcement had to be retained at Chagey, the 2d battalion of the 25th regiment and one battery were, at 9.30 P. M., drawn to the main reserve from Hericourt. On the 16th January the officer commanding the 18th French corps, seeing that the German position had been misunderstood, sent a division to Cremer and gave him a new direction, on Chenebier. On that day the 15th French corps did little, but strong attacks were made on the German centre and right.

In the morning the strength of the reserve at Brevilliers stood at five battalions, five squadrons, and three batteries. The reserve at Charmont was maintained. At 10 A. M. two battalions and a battery were sent to reinforce Bussurel: they returned later to the reserve. At 1 P. M. Bethoncourt was reinforced by two battalions and four guns from Charmont, and at 4 P. M. by the 7th Grenadier company. As a measure of precaution a battalion from the reserve was posted at Généchier, and, Cremer having forced back the Chenebier detachment to Frahier, the Brevilliers reserve sent the detachment two battalions, a squadron, and a battery,

by which means the further advance of Cremer was stopped for the night. At 5.15 P. M. Werder called in all troops that could be spared from the left to the reserve. Two battalions arrived from Sochaux. The same evening, taking two battalions from Brevilliers, General Keller moved on Frahier, where he was joined by a battalion of the 67th regiment from Belfort. He thus found himself with a force of eight battalions, two squadrons, and twenty-four guns to meet Cremer's turning movement.

On January 17th the reserve was strengthened at noon by a battalion from Hericourt, and at 3 P. M. by a battalion from Montbeliard. At the latter hour two battalions from the reserve reinforced General Keller. With this force Keller stopped Cremer, but he did no more. A German attack on Chenebier failed at 4.30 A. M.: a second attack, at 9 A. M., in which a battalion from Chagey vainly tried to take part, likewise failed. Probably, therefore, in the absence of Keller's strong reinforcement, Cremer might have continued his advance, thrust himself in rear of the German position at Hericourt, and given a new turn to the situation.

No doubt the attack was much dislocated by the impatience of the French right. This was due partly to the hardships endured by the men, but not wholly to that cause; for the commander of the 20th corps contrived to restrict to a cannonade the attack at Hericourt on January 15th. The impatience of the 15th corps must be partly explained by ignorance of the necessary slowness of Cremer's movements. The solution of the problem was also greatly impeded by the wrong direction at first assigned to Cremer.

The discount properly allowed for these events shows that in, for him, less favorable circumstances Werder would have been compelled to detach, even more heavily than he did, from the reserves to his right.

This action shows, therefore, a correct tactical application of field defenses, of which the essentially useful German reserves were the immediate outcome.

It is important to note that these field defenses were not constructed by infantry. All the fortress pioneers were brought up and used for the purpose, the bodily strength of the infantry soldier being thus economized for the fulfilment of his difficult task.

The second example is furnished by

THE BATTLE OF GRAVELOTTE.

Here field defenses were constructed by the French commander, but failing to make a correct tactical use of them, he lost the battle.

This battle in some respects resembles that on the Lisaine.

In both cases the plan of attack was to hold the enemy in front and turn his right from the north. In both cases this involved a change of front to the right on the right wing, executed under the eyes of the enemy.

Bourbaki wrongly conceived the German right to be at Mont Vaudois. On August 18th the German Head-Quarters Staff placed the French right

at Amanvillers. This is curious, as it gave to a force reckoned at 100,000 to 120,000 men a front of about 4½ miles, measuring from the French left, with which the VII. German corps was in contact. In consequence, here also the turning force was obliged repeatedly to change direction.

In both battles the power of corps commanders to avoid too deeply committing their forces was overrated. At Gravelotte the German attacks were not more simultaneous than those of the French on the Lisaine. On the right wing von Steinmetz seriously compromised the VII. and VIII. corps. Imagining the French left defeated, he launched his cavalry to complete the *déroute*. General Sheridan who was present, describes how those horsemen were handled and returned under the eyes of the king. Perhaps this mishap explains why von Steinmetz lost his command.

Towards Amanvillers von Manstein thought to take the French 4th corps by surprise. As a result he compromised the IX. corps, lost a part of his artillery, and had to be supported by a brigade of the Guard corps. Later on the Guard corps attempted to take St. Privât before the turning force had time to produce any effect, and in a few minutes was repulsed with a loss of six to seven thousand men.

Bazaine, like von Werder, expected to be attacked on his left. Unfortunately he went further, disregarded all warnings of danger on the right, and at 4 o'clock announced he thought all serious fighting over. He even went so far as to order his reserve into camp.

Finally Bazaine's position, like that of the Lisaine, is strong by nature on the left, weak on the right. About the Point du Jour the ridge is difficult of access, by reason of a deep gorge watered by the Mance stream running along its front. On the right, about St. Privât and Roncourt, the slopes are gentle, open, and glacis-like; nor is there a natural obstacle, like the Moselle, to protect the flank against being turned.

It has been advanced that there should have been a further resemblance between the battles. A strong reserve should have been posted in rear of the right; having more than 100,000 men for a front of less than 8 miles, Bazaine might have formed a reserve to his strong left from the corps intrenched there. He might then, by strong counter-attacks, for which there were opportunities, have destroyed the German attack. None of these measures were taken.

The strength of the French left, though partly natural, was chiefly due to skilfully laid out field defenses. An attempt will now be made to show that, in failing to take the above measures, Bazaine threw away the tactical advantages his field defenses should have given him.

The French position was thus occupied. On the right from St. Privât to beyond Roncourt, stood the 6th corps under Canrobert, with the 4th corps on its left about Amanvillers. Neither of these corps did much in the way of intrenching, most of the tools having been left behind. The 2d and 3d corps, forming the left and left centre, were very strongly intrenched. Each corps had a triple row of connected rifle pits,

tier above tier, with numerous gun pits, and covered communications. In front were many advanced posts, such as Leipzig, Moscou, St. Hubert, Point du Jour farms, all well fortified and strongly held. The woods, further to the front, by nature difficult to traverse, were partly occupied. In some places these woods were held throughout the day. There was no reserve to the right. A reserve to the left was composed of the Imperial Guard, 16,000 strong and 96 guns. It was posted at Plappeville.

As the 2d and 3d French corps disposed of about 10,000 men to a mile of front, and were, besides, very strongly intrenched in a good position, they might easily have formed their own general reserve. Moreover, the French left was not attacked with the same violence as the right. It was 3.30 P. M. before St. Hubert farm was captured by the VIII. corps. There was then more or less a pause until 4.30 P. M., when von Steinmetz made a strong attack which was decidedly repulsed. Except an unimportant advance on Jussy, nothing much was then attempted up to 7 P. M., when the VII., VIII., and II. corps made a combined attack against the Point du Jour. This attack really effected nothing: there was much confusion, the German troops repeatedly fired into each other, and there was a great deal of straggling. To assist in repelling this attack a brigade of the Voltigeur division of the Guard was brought to Moscou. This brigade had previously stood at Chatel St. Germain; the only movement of the reserve on the French left wing.

The German losses on the wings also show where they attacked most heavily. The two corps on the French left were attacked by three German corps, which lost 5372 men; the two French corps on the right were attacked by three corps—for the III. and X. corps took but little part in it—and these three corps lost 14,438 men.

Had the left reserve been formed in the manner proposed, the Imperial Guard would have been available as a reserve to the right wing. Anticipating no danger to his right, Bazaine made no provision for a reserve there: but as the morning wore on warning after warning came that the right was in great danger.

About 9 o'clock General de Ladmirault, commanding the 4th corps received warning from Marshal Le Bœuf, commanding the 3d, that masses of troops were seen in the distance towards St. Ail. The XII corps at Jarny, were in this direction, but distant 7 miles: the IX. corps at Caulré farm, and the Guard corps were then much closer to the French position, but not in the direction of St. Ail, To whichever corps the warning refers it is a distinct warning of danger on the right, and one can hardly imagine the commanding marshal not being informed. General de Waldner, then colonel of the 55th, states that on the morning of the 18th Prussian columns filed continuously under his eyes from south to north. The enemy was also reported about 9 A.M., by a company of the 64th, placed in observation at Montigny, towards Verneville; and it was further reported that some men at Verneville barely escaped capture. These are just the things which would be reported to the commander.

At noon the artillery of the IX. corps opened fire from the north of Verneville. Nine batteries were in action; some approximation might easily be made in estimating this number of batteries by observation; hence it might be inferred the army corps itself was not far distant, in fact, the infantry was even now advancing through the Bois de la Cusse to the attack of l'Envie and Chantreune.

At 12.30 the VII. corps, and at 1 P. M. the VIII. corps artillery opened fire from positions about Gravelotte. Also at the latter hour the artillery of the Guard corps opened fire from the north of St. Ail. It must have been possible now to locate, at least approximately, four German corps, of which one was as far north as St. Ail. This must certainly have been warning enough that the French right would be seriously attacked. Canrobert, so interpreting all signs, sent off at 12.30 for reinforcements, and was promised them.

At various hours then, up to 1 P. M., warnings were sounding of what was in progress, and at all times up to that hour a movement of the Imperial Guard was desirable. By road it is about 7 miles from Plappeville to a suitable position in rear of the right. Using the railway as well as the roads the Guard might have moved in three columns, which would be equivalent in time to a march of 8½ miles. If the guns moved off first, and were kept, where possible, at a trot so as to clear the road, this march might have been accomplished in three hours. If, then, the order to move had been received at 10 A. M., that is, one hour after the guns of the IX. corps opened, the right wing reserve would have been in position in time to take part in some of the most important events of the day.

What actually happened was very different. At 2.30 P. M., seeing no sign of reinforcements, Canrobert repeated his demand, and again at 6.30. The grenadier division of the Guard, and the reserve artillery, had actually marched off from Plappeville at 3 P. M., but they got no further than the northwest edge of the Bois de Sauluy. Thence Bourbaki refused to advance, though implored to do so, on the ground that he had no orders. It may be Bazaine had sent to recall him; for about 4 P. M., meeting some staff officers who were about to rejoin Bourbaki, Bazaine advised them not to do so, as the Guard corps was, he said, about to go into camp.

Bazaine had three opportunities for counter-attack on a great scale, had the means of making them been provided. The first opportunity occurred between 1 and 2 o'clock. The artillery of the IX. German corps had then been partly silenced at Verneville; the infantry attack of the same corps, in the general direction of Amanvillers, had come to a stand, and the assistance of the Guard corps had been demanded. The French 4th corps did make a counter-attack, but it was not supported, and quickly died out. What a difference if that attack had been made by a strong fresh reserve! To attain success at such an hour, the reserve ought to have been in position in the early morning. By 2

o'clock this opportunity was passing away. The Hessian artillery at that hour came into action at Habouville: at 2.30 a brigade of the Guard corps was on the march to assist the IX., the Guard corps itself being then between St. Marie and St. Ail. At 3 P. M.—when St. Hubert farm was on the point of capture—the artillery of the III. German corps opened fire from Verneville, so that henceforward the position of the IX. corps was too secure to admit of any successful undertaking against it.

The second great opportunity of counter-attack occurred when, at 4.30 von Steinmetz failed in his great attempt against the French left. Unfortunately by that time the Imperial Guard stood no longer in the rear of the left wing; it was gone, in fact, on a useless errand.

The third and last great opportunity occurred between 5 and 6 P. M. With no serious artillery preparation the Guard corps then attacked St. Privât, and was compelled to halt, its power of attack entirely exhausted, with a loss of between 6000 and 7000 men, considerably short of the French lines, and in momentary expectation of the counter-attack, which was never seriously made.

At this hour the Saxon corps had 12 batteries in action between St. Marie and the woods north of it. The artillery of the Guard corps was also firing on St. Privât; but the X. corps was still back at Batilly. If Canrobert had then been able to oppose to the artillery fire of the two German corps the artillery fire of his own corps, and that of the 96 reserve guns, the French infantry advance might not have been so easily checked by the powerful German artillery fire. As regards infantry, the IX. corps was fully engaged in front of Amanvillers, the III. corps were south of Verneville, and the X. at Batilly. Batilly was 3 miles from the scene of action, Verneville rather more. A part of the Saxon corps was within reach, not the 46th brigade, which was nearing Montois, nor the 48th brigade, which with two batteries, was between Montois and Auboué, but at all events parts of the other two brigades. On these, and on what itself it might still be able to do, the Guard corps must have depended to resist the sudden onslaught of the Imperial Guard, supported by some considerable fraction of the 6th corps.

Not having told off any reserve to his right Bazaine missed the chance of counter-attack against the IX. corps. He missed the other two chances because he had then practically no reserve at all. He might have had, he might have been in position to take advantage of the chance on the left, and the chance on the right, if he had marched off the Imperial Guard and the reserve guns at 10 A. M. There were many signs before that hour that the Germans were massing in the north.

Posted, as the French left was, behind elaborate field defenses, a reserve to the wing might have been drawn from the corps on that wing. There were opportunities of doing this between 10 A. M. and 4 P. M. Had it been done von Steinmetz might have been made to pay dearly for his attack at 4.30, though a counter-attack here would not have the value of

a counter-attack from the French right. Not to do it was to acquiesce in a tactical misapplication of field defenses.

In a work written after the Franco-German War Bazaine deprecated the use of field defenses, as tending to make men timid. This is very curious. At the battle of Gravelotte one of the few German successes on the French left was the capture of St. Hubert. That farm was not evacuated by the 2d battalion of the 80th regiment until about 300 men out of 700 were *hors de combat*.

The complaint against Bazaine is not that he failed to construct field defenses for fear of making his men timid, but that having constructed them he failed to put them to their proper tactical use.

ATLANTA CAMPAIGN.

This illustration deals with a series of actions, in each of which the defender is intrenched. By holding parallel intrenchments the attacking force occupies the attention of the defender, and in the meantime outflanks him, either by a turning force, or by a suitable extension of its intrenchments. The defending force is thereupon compelled to retreat.

In the early battles of the American Civil War of 1861–65 field defenses were hardly at all used. The battle of Shiloh, fought in April, 1862, is an example. The Federals, who stood on the defensive, were not intrenched. Only at one point, called the Hornet's nest, they were, says Johnston "protected by logs and other rude and hastily prepared defenses."

Grant, who commanded, writing afterwards, explained that his engineer, McPherson, found a position suitable for intrenching except in the matter of water supply. But he also says that the Federal troops then needed drill and discipline, which were worth more to the men than fortifications.

Sherman was on the ground some days before the battle. He states he was without orders to intrench, and he thinks such a course would have made the men timid. He adds the rather conflicting reason that it was intended to attack the enemy upon the arrival of Buell with reinforcements.

These may be after thoughts; yet it is quite possible that the omission of field defenses in these early battles was deliberate. A little later the defending force almost always intrenched itself, or sought the cover of walls or banks. When Burnside attacked Lee at Fredericksburg, his forces were subjected to an overpowering fire of massed guns protected by earthworks, and not themselves under fire. On his left he assaulted strong intrenchments; on his right the attack failed before a stone wall strongly manned by the Confederates.

At Chancellorsville, exceptionally, finding Hooker intrenched, Lee opened parallel works, and thus held Hooker to his front while Jackson made a turning movement.

Later on, at Gettysburg, Lee endeavored by a violent attack to

crush Meade's forces piecemeal. This was followed, on the two succeeding days, by a series of attacks embracing the whole Federal line of battle. On the Federal left the nature of the ground rendered intrenchments unnecessary. On the right this was not the case. Here the Federals threw up strong breastworks to resist a Confederate turning movement, and by successfully holding them saved their whole position. Foiled on this flank Lee hurled Pickett against the Federal centre. This, the final effort, likewise failed under the fire of artillery and of infantry behind walls.

In these batttles only the defending force was, as a rule, intrenched. The tactics of Chancellorsville were revived and formed into a system by Sherman in the Atlanta campaign of 1864.

In this campaign Sherman started from his base at Chattanooga with a force of about 100,000 men and 254 guns. His objective was Atlanta, towards which, therefore, he continually worked, keeping as near as he could to the Chattanooga-Atlanta railway, by which he brought up his supplies.

The Confederates, under Joseph Johnston, numbered at first about 42,000 men with 112 guns. Being thus so numerically weak it was Johnston's intention to defend a series of intrenched positions. Attacked in these positions he hoped to inflict on the Federals losses far exceeding his own. He knew that as Sherman advanced the necessity of continually detaching to defend the railway would mean to the Federals an always increasing loss of fighting power. Johnston as he retired would, on the contrary, continually pick up the detachments on his line of communications. Finally, the Confederate commander always hoped to be reinforced. For these reasons, Johnston hoped to become, as Atlanta was neared, not much inferior to Sherman in strength. He might then hope for some favorable chance of inflicting a decisive blow.

The Federal advance began on the 4th May, in three columns, called, respectively, the armies of the Tennessee, the Ohio, and the Cumberland, commanded by McPherson, Schofield, and Thomas. Schofield and Thomas marched on Tunnel Hill, where they found Johnston intrenched. They also intrenched themselves. Meantime McPherson marched on Snake Creek Gap, about 12 miles to the right, the nearest available pass through a range of hills extending from Tunnel Hill. This defile was reached May 9th: here the Confederate cavalry fought well, and McPherson, far from advancing, intrenched. Sherman supported him, and also attacked in front, when Johnston, alarmed for his communications, retreated, followed by Howard. On the 13th the Confederates took up an intrenched line at Resaca, running from the Oostenaula to the Connasauga, with one or two small advanced works in which guns were mounted. On the 14th, at 3 P. M., Hood assailed the Federal left, but was repulsed. Meantime Federal intrenchments sprang up fronting the Confederates; and, while these were held, McPherson, on the 15th, turned the Confederate left, whereupon the latter retreated.

Johnston abandoned his intrenchments at Adairsville without a struggle, deeming McPherson on his left, Schofield on his right, and Thomas in the centre, too dangerous.

The Confederates had three miles of intrenchments at Cassville, which were also abandoned, owing to some disagreement as to their defensibility.

On the 25th May the Federals arrived in front of the Confederate position at New Hope Church, and both armies worked most industriously at breastworks.

On the 26th May McPherson came up at Dallas and, next day, assaulted what he supposed to be the extreme left of the Confederate position. This supposition turned out to be wrong, the error being accounted for by the thick growth of timber and scrub on the flanks of the hills about Dallas and Marietta. The attack was repulsed with heavy loss, being made against intrenchments, and McPherson was himself compelled to intrench. Adopting a different plan Sherman directed Schofield and Thomas to extend their intrenchments toward Ackworth, so as to envelop the Confederate right. Johnston, noticing this, laboured strenuously to keep abreast of their works, but vainly, his numbers being inferior, and intrenching tools deficient. He, therefore, strove to gain his end in another way. On the afternoon of the 28th Hood was ordered to march round the Confederate right, form obliquely to the Federal left, and attack at dawn. At 10 A. M. on the 29th a report came in that Hood, having lost his way in the dark, now stood in front of R. W. Johnson's Federal division which was intrenching on the left of the Federal line, and almost at right angles to it. Hood was therefore recalled, the Federals continued their extension towards the railway, and Johnston retired, on the 4th June, to a position extending from Brushy mountain to Lost mountain. Moving McPherson across to his left Sherman at once directed him to work round the right of the Confederate intrenchments. This McPherson did, while, as usual, a line of works was thrown up facing the Confederate front; on this occasion, however, the Confederates, instead of retiring, merely threw back their right flank, resting it on Mount Kennesaw.

To meet this Sherman ordered McPherson back to his right, and pushed forward a second line of intrenchments closer up to the enemy. McPherson and Schofield on the right compelled the abandonment of Pine and Lost mountains by the 16th June, and the Confederates fell back to a line of intrenchments, extending from Mount Kennesaw by the west of Marietta for several miles.

Again Sherman formed his line, in some cases successive lines, of intrenchments, but he seems for the moment to have abandoned his outflanking policy.

On the 22d Hood, with two divisions, broke through a line of Federal breastworks; he then endeavored to change front so as to sweep the lines of intrenchment, but failed to do so under an overwhelming artillery fire brought to bear on him, and was compelled to give it up.

On the 24th and 25th Federal attacks failed with heavy loss, and on the 27th Sherman ordered a great frontal attack. It is difficult to understand why this frontal attack was made. Sherman asserts he had not men to spare to work round the Confederate left, yet Johnston declares this was subsequently done, though the Federal losses in the attack—2500 to 6000, as variously estimated—far exceeded the Confederate loss, which amounted only to 630.

The fight lasted 2½ hours, and was most desperate. General Howard states that Kirby's brigade took and retook a hill which it intrenched and finally held; that Harker's brigade captured, along with the defenders, a part of the Confederate line, which was intrenched and well defended; and that Baird's division, in a comparatively open field, executed a trench parallel to and 400 yards from the Confederate works, keeping down the enemy's fire by the fire of their skirmishers. The attack, however, failed.

The Confederate commander states that the Federal trenches were now extended until their right was nearer to Atlanta than his own left. He was now stronger than when he began the campaign; he had been reinforced to 60,000 men and 168 guns; nevertheless he deemed it prudent to retire to an intrenched position 9 or 10 miles south of Marietta. Here he was outflanked by the march of Schofield and McPherson, and, on the 5th July, withdrew to a position north of the Chattahoochee. Here he had 5 miles of intrenchments strengthened by redoubts.

Sherman at once opened trenches, and dispatched Thomas and McPherson to his left, not, however, beyond supporting distance, and Johnston, thinking the Federals were interposing between himself and Atlanta, took up a new intrenched position south of Peach Tree Creek. The time was now come when he expected to have a fair chance of destroying Sherman. He watched McPherson to Decatur, Schofield to a point between Decatur and Atlanta, and arranged for the 20th July an attack on Thomas, who was then busy crossing the creeks. That unfortunate moment was chosen to change the commander of the Confederate forces, Johnston being succeeded by Hood.

The attack of the 20th was carried out by Hood, but miscarried. It was said in explanation that the Confederate infantry was demoralized by continued retreat, and constant failures against Federal intrenchments. Hood did not attribute any loss of *morale* to the use of intrenchments; and it may be remarked that on the 30th November following Hood attacked Schofield in an intrenched position, and discontinued the attack only when his own loss was as heavy as 6252 against a Federal loss of 2356. The Federals, again, under command of Thomas, on the 15th December, attacked Hood, also in an intrenched position, and completely destroyed him.

After his failure of July 20th Hood took up an intrenched position round Atlanta. He repeated his attack on the 22d. In this attack Hardee attempted to turn the Federal left, and very nearly succeeded.

By chance Dodge's corps, awaiting orders to advance, stood across the line of Hardee's advance from the Federal left rear, so far had Hardee got round. Dodge's corps merely fronted, facing Hardee, and succeeded in driving him off. At a second part of the Federal lines the Confederates made a frontal attack, and broke through, but being themselves then taken in flank were compelled to retire.

One more attack Hood made at Ezra Church. This too failed. He then stood on the defensive till September 1st, when he slipped away north, leaving Atlanta in Sherman's hands.

Thus, during 86 days, from May 4th to July 28th, Sherman made good 120 miles, and inflicted on the enemy a loss of 40,000 men. His own loss was about the same. He had captured Atlanta, and was quite in a condition to commence a fresh campaign. Under the circumstances his application of field defenses must be considered correct. He used them to hold strictly to his front a defending force carefully intrenched. He then either threw a force against the flank of the enemy, or so extended his own intrenchments, as to overlap a flank of the enemy, and thus caused the defending force to retire. Meantime, fighting of greater or less intensity was continuously carried on, while the forces faced each other, with, on the whole, about equal losses.

The method of constructing these defenses is interesting and important. The Confederates used slaves. They did not usually work under fire, the positions to be occupied successively being chosen and prepared beforehand. As the lines of intrenchment were on occupation frequently much extended, the Confederate infantry must have worked also a good deal.

In this campaign Sherman authorized each division to organize a pioneer corps of escaped freedmen, 200 strong. They were fed, and promised pay at the rate of $10 a month. These men worked while the troops slept, and as they did not fight were allowed to sleep by day. In this way, no doubt, the troops were saved much severe work.

The nature of intrenchment used was the same by both Federals and Confederates. Trees and bushes cut away for 100 yards in front formed an obstacle. Parapets four to six feet high were formed from a ditch outside, and were surmounted by a head log. The head log was composed of trees twelve to twenty inches diameter at butt, resting in notches cut in other trunks so laid as to slope backwards. Where possible, and time permitted, shelves were made to receive cartridges. The parapet, it should be remarked, contained a good backbone of stout timber logs.

WILDERNESS CAMPAIGN.

In the actions of this campaign the attacking force always intrenched itself, but never in order to act against a flank. Seeking to wear down its adversary by steady attrition, the attacking force intrenched itself close to the intrenchments of the defender, so as to have rallying points in desperate frontal attacks.

The campaign took place while Sherman was advancing on Atlanta; Grant was then fighting Lee in the Wilderness and towards Richmond.

Sherman's object was the capture of Atlanta with all the vast amount of stores and munitions it contained. Each time he compelled the Confederates to retire he gained an important step; for he was so much nearer his goal, and the moral advantage to his men outweighed the effect of numerical loss.

Grant had to solve a problem of a different kind. In 1864 the condition of the Confederacy was such that it depended almost entirely on Lee's army for ability to resist further. Now, Lee was the most skilful leader the war had produced. He had also the entire confidence and affection of his men. These men were equally ready to advance, fight, or retire, just as Lee thought best: it made no difference in them. Half fed, ill clad, though by no fault of their general, the Confederate soldiers were, under Lee, always the same. Hence Grant chose for his objective Lee's army. His plan was to destroy that army by sheer losses inflicted in hard fighting. He did not wish his adversary to slip away after the manner of Johnston; his sole desire was to fight, as long as he continued to inflict severe losses.

At the beginning of the campaign Lee had about 49,000 infantry, 8400 cavalry, and 224 guns, manned by 5000 gunners. The infantry were in three corps, under Ewell, Hill, and Longstreet. The cavalry were under Stewart, a very successful leader, who kept Lee informed on every point. These corps, watching the Rapidan, were at first rather scattered, Longstreet being at some distance in rear. To oppose these Grant had 122,000 men and 354 guns. This force was composed of the Army of the Potomac, commanded by Meade, and Burnside's IX. corps. The Army of the Potomac comprised the II., V., and VI. corps, respectively under Hancock, Warren, and Sedgewick. The cavalry, 12,000 strong, were led by Sheridan, a vigorous and energetic soldier.

Grant was in motion on the 3d May, 1864. On that and the following day the II. corps, crossing the Rapidan at Eley's ford, marched to Chancellorsville. The V. corps moved by Germanna ford to Wilderness Tavern. The VI. corps, also crossing at Germanna ford, advanced 3 miles. These short marches were arranged so as to protect the immense and slow moving train. The orders for the 5th May were, II. corps to advance to Shady Grove Church, V. corps to Parker's store, VI. corps to Wilderness Tavern. The IX. corps was this day at Germanna ford. Grant had no wish to fight in the Wilderness itself. The dense scrub here made cavalry and artillery almost useless, while even infantry fought under great difficulties. These difficulties, however, suited Lee, as they helped to balance the greater numeral strength of his opponent. It was resolved, therefore, to fall upon the Federal corps while they were all separated: thus it was Lee who brought on the first fight.

Ewell was despatched against the V. and VI. corps, Hill against the II., with orders not to bring on a general engagement until Longstreet

should have come up. Menaced on their march the Federal leaders took the initiative. Warren and Sedgewick were repulsed on the right, but on the left Hancock broke Hill's line, an advantage which could not be pursued, as night fell. Both parties intrenched during the evening, neither much the worse, for the combats on the right and left were wholly disconnected and ineffective.

Next morning the Federals again attacked. They effected nothing against Ewell, who had strengthened his position. Hancock at first met with success, but before he could re-form, Longstreet appeared on his left, and compelled a halt. Hill now advancing in his turn, Longstreet prepared to dash forward with his whole corps; taken in front and in flank Hancock must have been overwhelmed, when, by chance, some of Hill's men badly wounded Longstreet. The attack was suspended, and could not for some time be renewed. By then Hancock had restored order, and organized and pushed home a strong counter-attack, by which matters were restored to an equality.

On the Federal right the Confederates also made a flank attack; it caught the enemy building breastworks and caused some confusion, but nothing worse, owing to the lateness of the hour. The IX. corps arrived during the course of the day, but merely served to fill the wide gap between the Federal wings.

On the 7th the Confederate position was reconnoitred and found so strongly intrenched, and with artillery so carefully disposed, Grant resolved to continue his march, hoping for a chance of fighting in more open ground.

The Federal losses in this battle amounted to 15,387 killed, wounded and missing. The Confederate estimated loss is 11,400. Considering the strength of the two armies Lee had lost relatively more than his adversary, though neither side could claim a victory.

That evening the Federals were drawn off, the II. corps moving to Todd's Tavern, and the V. in the direction of Spottsylvania Courthouse. The VI. corps sent one division to Piney branch church, a second to the intersection of the roads, Piney branch church, Spottsylvania Court House, Alsop's Old Court-house, and a third to a midway point. The IX. corps was ordered to Piney branch church. The cavalry covered these movements, which were continued on the 8th. Meantime Lee pushed on his cavalry to Spottsylvania, following with his infantry, and was securely intrenched north of the Po before the enemy came up.

During the 9th intrenching continued. On that day Sedgewick was killed, and General Wright took command of the 6th corps. It will be noticed that Lee's intrenchments form a deep curve, with a marked and dangerous looking salient at the extreme northern point; this was known as the "bloody angle." It is stated to have been necessary to form this salient, so as to take in a knoll whence the Confederate lines would have been under destructive enfilade fire. All the serious fighting at Spottsylvania turned on desperate Federal attempts to capture this

salient. Lee's chief apprehension was for his left. These two facts known, the movements of the battle are easily cleared of their apparent complications.

The disposition of the Federal corps will be understood from the skeleton map, on which the bloody angle is marked. On the right stood the II. corps, next the V., then the VI. opposite the western face of the salient, with the IX. on the left, opposite the eastern face of the salient.

On the evening of the 9th Hancock made the attack Lee dreaded against his left, but too late to insure success. Renewing it next morning he found Lee thoroughly prepared, and had to withdraw. While doing so he was violently attacked by Heth of Hill's corps, and suffered severely. That evening the V. and VI. corps made an attack from their intrenchments, supported by the II. corps, against the western face of the salient and the Confederate left. A division of the VI. corps made a lodgment under Upton's leading, but lost it owing to bad leading of the other division by Mott. The attack of the other corps was repulsed.

For the 11th May an important move was ordered, the II. corps being brought on the prolongation of the capital of the salient, in readiness for a combined attack next day.

All four corps took part in this attack, the II. at the salient angle, the VI. against the west, the IX. against the east face, the V. from its own entrenchments. When originally constructed the salient had been rendered fairly strong by posting batteries in it. Still anxious about his left Lee now withdrew these guns, using them against the Federal extreme right. This caused Warren's attack to fail; but, on the other hand, Hancock, supported by Wright, carried the salient in spite of enormous losses. Meantime the Confederates had closed the gorge of the salient, and no further advance was found possible.

During the 13th and 14th May the V. corps moving round formed up on the left of the IX., and the VI. formed on the left of the V. corps. The 15th to 17th May were occupied in intrenching the new positions taken up. The final attack was made on the 18th May, by bringing the VI. corps suddenly to the Federal right, to the assistance of the II. and IX. corps. So strong were the Confederate intrenchments the attack was early abandoned, the VI. corps resuming its place; to its left rear was brought the II. corps, to its left the IX.

In this battle the Federals lost 17,723 men, the Confederates, in all probability, considerably less.

As, in Grant's opinion, nothing further could be profitably attempted against so strong an intrenched position, the II. corps was despatched, on the 20th May, to Guinea Station, on the Richmond-Fredericksburg railway. The other corps held their intrenchments, merely endeavoring to draw the Confederate fire. It was hoped Lee might pursue the detached corps, thus possibly giving the others a chance of coming up with and attacking him before he had time to intrench. Lee, however, stood fast.

Seeing this, Grant, on the 21st, directed the V. corps to follow to Guinea Station, where the II. corps was now arriving. As soon as the road was clear the IX. corps took the same direction. The VI. corps held its intrenchments to cover the movement. In this position it thrust back a part of Hill's corps which was carrying out a reconnaissance ordered by Lee. It then followed the IX. corps.

On the 22d May, in continuation of the movement the II. corps reached Milford, the V. Harris' Store, the VI. Madison's Ordinary, and the IX. New Bethel Church. The same day, Lee, cutting across, reached Hanover Junction, where he received a reinforcement of 20,000 men, and rapidly took up an intrenched position. On the 23d the V. corps, moving to Jericho Mills, crossed the North Anna; the VI. corps moved to Mount Carmel Church; the II. and IX. took post about one mile north of North Anna. All the corps intrenched.

Lee's position was now very strong. His left rested on Little River, his centre and right on a bend of the North Anna. It was impossible for Grant to attack. An attack on either wing could only be isolated, or supported from the other by crossing the river twice, while Lee could move his troops at pleasure. Nor was Lee able to attack. "Leaving 7000 men to hold the left face of his intrenchments, and the apex on the river," says Humphreys, "Lee might have attacked Hancock with 36,000 men; but intrenchments make up for greater differences than that in numbers." Hancock had then about 24,000 men.

There was very little fighting, therefore, on the North Anna, the Federal losses amounting to about 2000 men. On the evening of the 26th May General Meade's army was again in motion.

The V. and IX. corps moved to Hanover Town; the II. and VI. crossed the Pamunkey in the neighborhood of Crump's Creek. This occupied until the 28th. Meantime Lee, who knew what had been going on, had taken up and intrenched a strong position on the south of the Topopotomoy. On the 29th the VI. corps made a reconnaissance towards Hanover Courthouse, and the II. towards Hawes shop; while the V. corps, followed by the VI., moved along Shady Grove road. This disclosed Lee's position, but it was judged too strong to be assaulted without the certainty of disproportionate loss.

Refraining from immediate attack, Grant endeavored to seize a position whence he might rush Lee in the open. With this object he moved the II. corps to Cold Harbor, forming up on its right the XVIII. corps, which now arrived from Butler's force. When these two corps advanced in the evening they found that Lee had anticipated them, his right having been extended, and, as usual, intrenched. They could do no better than intrench as near the Confederate line as they could get.

Next day, June 2d, the II. corps moved up on the left of the VI., the V. extended so as to connect with the right of the XVIII., and the IX. took post in the right rear of the V. In this order a direct assault was made

on June 3d; it was badly planned, all the corps fighting independently; the result was a repulse with a loss of 13,000 men. The total Confederate loss for the week ending June 3d is estmated at from 1500 to 4400 men.

If accounts may be believed the first phase of the campaign here ended because the Federal troops so willed. They were now moved across the James River, and in the second phase attempts were made against Lee's lines of supply.

General Humphreys states that, in July, 1864, Lee had, including 7000 received from Beauregard, 38,000 infantry. As he had then detached Early with about 8000 men, he must have had 39,000 at Cold Harbor. He began the campaign with 49,000 infantry, and received of reinforcements 20,000. Hence his loss must be computed at 30,000. In the same period Grant is known to have lost 53,000 men.

Grant's losses were, therefore, to those of Lee, nearly as two to one, and he had thus far failed in his object, the destruction of Lee's army. It will be observed that Grant made no flank attacks, nor did he try to out-manœuvre his adversary. He used his field defenses to shorten the distance advanced over in attack, and to aid in rallying the troops after repulse. It may be concluded that against a skilful adversary, capable of making vigorous counter-attacks, such an application of field defenses is wrong.

The intrenchments here used closely resembled those employed in the Atlanta campaign.

Slaves were largely used in the Petersburg defenses, but not probably by Lee in the Wilderness campaign, as he had always the greatest difficulty in feeding his men. In the battle of the Wilderness, on the 5th of May, Warren placed 1200 engineers in his second line; on the following day he used them in intrenching, and never again as infantry, finding it so difficult to replace them.

Both the Wilderness and Atlanta campaigns were fought in a country readily lending itself to the formation of log breast-works. Evidently there are many districts where this might again happen.

THE BATTLE OF MAGENTA

furnishes the next illustration. Here the defending force failed to use a great obstacle on sound tactical principles, and the whole advantage of the obstacle passes to the attacking force, and with it the victory.

In this battle, fought June 4, 1859, the Austrians were, of necessity, on the defensive. Their position, just to the west of Magenta, was behind the Grand Canal. As the canal can be crossed only by bridge, and has steep banks covered with bushes, it forms a fine tactical defensive obstacle. With the intention of strengthening this obstacle, the Austrians had also a *tête-du-pont* at Boffalora, and on the railway intrenchments, and a redoubt protected by abattis. The bridges at Boffalora, Ponte Nuovo, and Ponte Vecchio were prepared for destruction.

On June 3d McMahon, with the French 2d corps, and Voltigeurs of the Guard, crossed the canal at Turbigo, about six miles from Ponte Nuovo, and next morning marched down the canal to fall upon the Austrian right. Against McMahon's 22,000 men the Austrians sent about 8000, comprising two brigades of the I. corps. To hold the Austrians to their front along the canal the French Emperor had at first only 5000 men; the 2d Grenadiers of the Guard opposite Boffalora, the 1st Grenadiers and the Zouaves at Ponte Nuovo, and the 3d Grenadiers at Ponte Vecchio. Opposed to these the Austrians had at first 20,000 men, namely, of the I. corps, two brigades at Boffalora, and of the II. corps, two brigades at Ponte Nuovo, and one at Ponte Vecchio.

The nearest French troops were close at hand, but in strength only a brigade of 3500 men; the remaining forces, though repeatedly and urgently called, were still at some distance from the field. The Austrians had 12,000 men, distant 3½ miles, namely, the 4th brigade, II. corps, at Robecco, and two brigades, VII. corps, at Corbetta: they had also 24,000 men distant 6 miles, namely, the III. corps at Abbiate Grasso, and the remainder of the VII. corps at Castelletto. No other troops were within call.

The Austrians, on being attacked, almost at once abandoned their earthworks, which became later on of some use to the enemy. Retiring across the canal, they attempted to blow up the bridges, but failed, except in the case of the Ponte Vecchio. They then moved a brigade from the front to the right wing, but even then they only opposed 12,000 men to 22,000 in the open, while they had 16,000 behind, an obstacle against 5000. By hard fighting the French contrived to capture the Ponte Nuovo and one or two houses on the Austrian bank. At Boffalora they could manage no more than the preservation of the bridge.

The French began this frontal attack on hearing McMahon's guns on their left. It had reached the stage described, when suddenly all firing on the left was suspended. Erroneous dispositions caused a check in McMahon's advance, which had got as far as Casale, and was not resumed till 3.30 P. M. The French Emperor was on the point of ordering a retreat, when the arrival of brigade Picard brought him up to 8000 men on the canal. With this force he contrived to hold double his strength of Austrians to the canal, while McMahon marched steadily on against inferior numbers.

From 4.30 P. M. onwards, Austrian reinforcements began to reach the field. Of these the 8th brigade, II. corps, followed by the III. corps, less one brigade, took the French bank of the canal, and attacked near Ponte Vecchio, but the attacks were not made in concert. Wetzlar's brigade of the III. corps, moving still further to the Austrian left, effected still less. Only the VII. corps took the Austrian bank of the canal. Instead of reinforcing the right wing, this corps moved on Ponte Nuovo and Boffalora, relieving a division of the II. corps, which did reinforce the right. But that support was now useless, being balanced by

the arrival of a Sardinian division to McMahon, who was able to push on against still far inferior numbers. By the retreat of the Austrian right wing, carrying with it a part of their front, the bridge at Boffalora was uncovered, and the French troops dashed over, followed by parts of the 3d and 4th corps, which had now for some time been arriving. The French outflanking force being now overpowering, Ponte Nuovo was uncovered, and Ponte Vecchio was taken in rear, the Austrians retreating on Magenta. The battle was practically over, for the Austrians on the French bank of the canal were not strong enough to make any progress against the portions of the French 3d and 4th corps directed against them.

Thus the French successfully used the canal almost in the same way as Sherman used his intrenchments in the Atlanta campaign. Considering their relative strength the Austrians need not have permitted it. McMahon was in such a situation that, until the evening, he could hope for no support whatsoever. For many hours, therefore, he was at the mercy of any superior force brought against him. Leaving say 2000 men to watch the canal, the Austrians might have opposed 26,000 men to McMahon's 22,000. McMahon, if compelled to retreat, would have been in a most critical position, with the canal to cross, and only two small bridges available.

Neither force appears to have had bridging material available. At any trouble to themselves the Austrians should have made absolutely sure of being able to destroy at pleasure the four canal bridges on their front. They would thus have formed an impassable obstacle which 2000 men would have sufficed to watch, and McMahon might have been destroyed.

Even with its bridges still intact the canal was an obstacle more easily defended than the intrenchments of Sherman and Lee. The Austrians need not, therefore, even as matters stood, have allowed an attacking force of 5000 strong to paralyze even an equal number of defenders. There were also 12,000 Austrians only 3½ miles from the critical point. There were several hours, therefore, during which the Austrians might have held the canal as an obstacle easily defended by small numbers, while superior forces overwhelmed McMahon. It is natural to ask why this was not done.

Two reasons may be suggested. The Austrians in this campaign were badly commanded. At Magenta considerable forces were sent against the French right, apparently in relief of the Austrian frontal force, which was already over strong. Of the forces so sent, Kintzl's brigade of the II. corps made its attack far too soon, and the III. corps made its attack far too late. But in every action, at Montebello, at Palestro, at Solferino, it might be shown that, however well and bravely individual divisions fought, second divisions were never brought up until first divisions were ruined, and the advance of third divisions was never resolved on until second divisions were destroyed. Between the

art of commanding a small force of the three arms, and the art of commanding a great force of the three arms, there is a difference, not of degree, but of kind.

Secondly, in this campaign the Austrians seem to have been contented with very scanty information of the enemy's movements. This is easily shown. Until May 28th the Austrian army was disposed on an arc, from Palestro, on the Sesia, along the Po to Pavia, IX. corps at Piacenza, II. corps at Mortara, where the head-quarters were. At that time the Franco-Italian army stretched from Casale to Voghera, along the south bank of the Po, with headquarters at Alessandria.

On May 20th Count Stadion made a reconnaissance in force against the French right at Voghera, employing 16 battalions, 6 squadrons, and 16 guns, about 20,000 men. His attacks being unconnected, Count Stadion was driven back by a small French advanced force, the strength of which was consequently greatly overestimated.

On May 28th the French began and completed without interruption a flank march on Novara, which brought them on the Austrian right flank. To screen this march the Sardinians, supported by the 3d corps, moved, May 31st, on Palestro, where the Austrians attacked.

By June 1st the French and Sardinians were within the triangle, Novarda–Vercelli–Robbio, and McMahon crossed the Ticino, practically unopposed, on the 3d June.

Partly deceived, possibly by Count Stadion's reports, as to the strength of the French about Voghera, the Austrian commander had now suspicions, and no more, of what was going on. For, in the meantime he merely called the IX. corps to Pavia, concentrated the V. corps, somewhat retired the III. and VII. towards Mortara, and directed only the I. corps, which had just reached Italy, upon Magenta.

So little idea had the Austrians of the threatened disaster to their right at Magenta, they directed their reinforcements, not to their right wing, but to the canal; and when McMahon halted to reorganize his attack, they announced the battle won.

These reasons, perhaps, explain why the Austrians failed to make use of a great obstacle to their own advantage on sound principles. The illustration also shows, what is more striking, this very failure made of the canal an obstacle, by using which correctly the French were enabled to succeed in a flank attack.

Last example, the

BATTLE OF TACHKESSEN.

Here a small force covers the retreat of a larger: making a great display of strength it uses field defenses to aid in deceiving the emeny, and induce a formal attack.

This battle was fought in the Russo-Turkish War of 1877–78. Towards the end of 1877 a Turkish division, 13,000 strong, under Shakir Pasha, stood posted at the Araba Konak end of the Orkhanié Pass

through the Balkans. A superior Russian force stood within the pass. Both forces were very strongly intrenched.

After the fall of Plevna the Russians, being reinforced, began a turning movement by Tchuriak. The success of this movement being discovered, it was realized that Shakir Pasha's position was no longer tenable. The nearest Turkish troops were at Sofia, but the Russian advance from Tchuriak soon cut that line; hence Shakir resolved to retreat on Petric.

For the removal of his heavy guns and large quantities of material the Turkish commander required time. It was, therefore, necessary to cover the Petric line of retreat against the Russian turning force. For this purpose Baker Pasha took 3000 infantry, three weak squadrons, and seven guns. The valley of the Malinska at this part consists of western and eastern plains, separated by a spur of the Balkans. This spur offers the one position for a force covering the Petric line against attack from the west. It consists of two nearly parallel ridges, about a mile apart, each ridge having a number of small crests, and the two ridges being joined together by necks quite invisible from the western plain; so that the internal movements of the force on the spur were well concealed, except from points on the Balkans. The two ridges being of about equal elevation there is no view of the western plain from the eastern ridge; but the joining necks made it possible to retire on the eastern ridge when the western was no longer tenable.

As the action was to be a delaying one—to save Shakir's force and all its material—Baker Pasha desired to make as great a show as possible. Therefore, he had at first only 320 men on the eastern ridge; and 320 in the village of Tachkessen, the remainder being disposed along the western ridge. To assist in the deception the left wing was intrenched as far as the centre, and the right, the ground being too rocky for excavation, was placed behind dry stone walls. Tachkessen was placed in a state of defense. These arrangements were carried out December 28th. On that day the Russians advanced by Hajedani towards Daoud Koi. On being fired on from the Turkish position the Russians, apparently uncertain what was in front of them, discontinued their advance and began to intrench. That night a snowstorm began and continued over the 29th. No advance was made, but large Russian reinforcements arrived. On the 30th a Russian brigade moved up the heights to the right of the Turkish position, and there intrenched. Their cavalry reconnoitred beyond Tchokantcha.

On December 31st the action was fought. The Russians advanced against Daoud-Koi on the left, Tachkessen in the centre, and Makatch on the right, intending to envelop the whole Turkish position. The advance of the Makatch column necessarily occupied a considerable time, but on the whole the three attacks were fairly well concerted.

The Turkish western ridge being now generally assailed, the retirement on the eastern ridge was begun. Under cover of a cavalry demon-

stration Tachkessen was evacuated and the centre withdrawn. On the right, the Russian attack having been successfully repelled, the troops were withdrawn ; and by half past twelve a new right and centre were firmly established on the eastern ridge. On this force the left managed also to effect its retirement without any great difficulty.

Meantime the Russian enveloping movement was continued, and at about 2 o'clock the wings found themselves in possession of the abandoned western ridge, but apparently more or less showing their flanks to the eastern ridge, from which a heavy fire was directed.

Under this fire the Russians proceeded to reform their columns, and despatch them against the eastern ridge. This attack was to a great extent frontal, and thus far failed. Eventually the Turkish left was outflanked, but by that time darkness had fallen, and it was impossible to continue the action. The eastern ridge, therefore, remained uncaptured. During the night Baker Pasha made good his retreat Shakir's rearguard being found at Acha Kamarli. Thus Shakir's force, with nearly all its guns, and nearly the whole of its material succeeded in escaping.

In this action a force of about 3000 men occupied a front of three miles, but only with the object of deceiving the enemy as to their numbers. Field defenses were used to aid in producing the impression of a strongly occupied position. The Russians delayed attack until they had a strength estimated at 30,000 men, so that the plan of defense was successful.

Examples of defensive actions, fought with a similar delaying object, and much on the same plan are very numerous. A good illustration of the use of field defenses, constructed and held to deceive the enemy, though not in actual battle, is furnished by the American Peninsular campaign. The instance is McClellan's change of base to the James River.

These illustrations show that, in recent battles, field defenses used on correct tactical principles have given good results ; neglect of such principles has led to disaster. Probably this will continue to hold good.

But when we consider the practical construction of field defenses two questions arise. The effect of high explosives in shells fired from field howitzers is great. Under such fire it might be impossible to occupy intrenchments without heavy loss. In some cases such loss might be avoided if the firing line were withdrawn behind a fold of the ground, the intrenchments being manned only to meet the advance of infantry. But often the configuration of the ground would not admit of this, particularly against howitzer fire. All depends on the ground itself. A return to the old principle of salients, giving flanking fire, might once in a way be the solution of the problem.

Would it not help to elucidate the question, if we worked out on the ground defensive actions, employing very large forces against skeleton attacks? Here also would arise opportunities of studying the delivery

of counter-strokes. This is important to officers laying out lines of intrenchment, as they are bound to consider the positions of the reserves, and along what lines the reserves would advance to make their counter-attacks.

Supposing it to be decided to use field defenses, the second question is, Who should construct them? Our text-books do not give much information as to the penetration of various bullets: the infantry drill book gives three feet of earth as proof against any bullet. Field defenses, if used at all, should be good enough to give cover to the last. There are materials used for defensive purposes, including some kinds of earth a thickness of three feet of which seems rather scanty. Also the minimum safe thickness should still remain at the crest of the parapet, after allowing for a good shaking down of earth, under the fire of artillery and infantry. The intended inference is that, when constructed, field defenses should be substantial and somewhat carefully made.

They might be constructed by the troops or by a special force, as was done by von Werder, Sherman, Johnston, and Warren. There are advantages in using a special force. (1) It saves the physical strength of the infantry, all of which is required for the long marches now exacted, and for the long hours, even days, of battle during which the men may be under arms. (2) A special force should execute the work quicker and better. (3) The carriage of tools might thus be more easily provided for, and their arrival exactly where wanted, and at the right moment, more certainly assured.

On the other hand an additional force implies more food to be found and transported; unless, indeed, such a force carried its own supplies in some useful concentrated form. Such a force might also be employed on other duties.

If the construction of field defenses must be done by the troops, the individual training of each man in the art of digging—for it is so far an art that it has to be learned by practice—is an absolute necessity. That is to say, it should be insured that each man knows how to dig rapidly, and without taking too much out of himself.

It might also be found desirable to arrange that a certain proportion of picks and shovels were carried on mules. If so, these animals would certainly need to be trained.

FIELD ARTILLERY FIRING REGULATIONS IN FORCE IN VARIOUS COUNTRIES.*

(From the Memorial de Artilleria.)

Translated by FIRST LIEUT. GEO. W. VAN DEUSEN, 1ST U. S. ARTILLERY.

IN order to form a just and accurate opinion as to our new firing regulations, we should have some acquaintance, at least, with those in use in other countries. Leaving out of consideration Austria and Russia, in which countries the battery is composed of eight pieces, we have remaining Germany, Italy, France and England, whose batteries are composed of the same number of pieces, the only difference being that they are arranged in three sections of two guns each instead of our system of two sections of three guns, an arrangement apparently due to some official oversight.

We will not take into consideration the firing at movable targets, as this is separated from the firing at fixed objects by certain rules which are practically the same in all countries. Our discussion will be confined, as far as possible, to the general principles governing shell, shrapnel and indirect fire.

GERMANY.

In this country definite regulations regarding common shell have not yet been promulgated, since it is intended to substitute a high explosive shell with double action fuse, but we will consider percussion fire with this projectile as far as given in the published firing regulations, which bear the date of 1893, with various additions bringing them up to February, 1896.

Firing at Fixed Targets.—The following paragraphs give a brief summation of the rules governing percussion and shrapnel fire.

RANGES EXCEEDING 1500 METRES.

Percussion Firing.—Fire to obtain a fork of 50 metres. Series of six explosions with the smaller range of the fork.

Correction.—If ⅓ to ⅔ of the explosions are short, the first correction is 50 m. and if this gives too great a result, then 25 m. If the three first explosions are at practically the same point, correct by 50 m.

Shrapnel Firing.—Firing with percussion shell to obtain fork of 100 metres. Series of time explosions with the lesser range of the fork to correct height of bursting. An alternate series using both ranges of the fork (greater and lesser) until the most advantageous range is found, which range is used.

The normal height of bursting should be about 1-300 of the range. It is allowed for by means of elevating plates and the pointing arc. In correcting the range a single distinct explosion may be sufficient, and but one is necessary after the range has been increased by 100 m.

* A lecture delivered at the Central Firing School of Spain during the course of 1896.

RANGES LESS THAN 1500 METRES.

Obtain a large fork of 200 metres.

The elevating plates are abandoned and elevation is given by the revolving eye-piece, which is equal to two plates or about 100 metres.

In order to understand this matter, some explanation should be given of the use of the elevating plates and revolving eye-piece. The German fuses are graduated to distances, each one indicating the amount of the burning mixture required to give the normal height of bursting at that range. Such graduations correspond with the sight elevation if all conditions entering the table of fire are accurately fulfilled. As this does not always occur in actual practice, it frequently becomes necessary to make a correction for bursting independent of the elevation.

For a long time the German firing school failed to find a solution for the difficulty which would be encountered by the captain while directing the fire and using two elevations, one for range and one for fuse, until the scheme of the elevating plate was settled upon.

Suppose that for a given range the time of burning was excessive and resulted in too low a burst. If a small metal plate be placed upon the upper surface of the socket in which the rear sight seats, the upper surface of which takes the place of the upper surface of the socket; then by setting the sight at the same graduation, the range will be increased by an amount corresponding to the thickness of this plate. The fuse being set at the same distance as before, the burning of the composition will give a higher bursting point at the required distance. This height will be still more increased if a second plate be added to the first, and so on until the normal height of bursting is obtained.

This system of plates gives a method of raising the height of bursting for a given range. As each one of these plates increases the actual range by a certain fixed quantity (about 50 metres), if we wish to return to the old trajectory, the actual range must be reduced by the same quantity for each plate used.

The revolving eye-piece consists of a thin metal disc revolving in a frame so that it presents an eye-piece raised above the regular one on the sight by a distance equal to the thickness of two plates. This revolving sight is used, as previously stated, with shrapnel fire at ranges less than 1500 metres, since it is considered that for short ranges, having a flat trajectory and great remaining velocity, it is better to have increased intervals between explosions.

It is difficult to understand why, if a general method of correction was sought, the graduations on the fuse should not be so arranged with reference to the origin of the burning composition that the correction could be made by the fuse at once and so avoid this auxiliary method, which could not fail to cause confusion in the heat of action.

The metal plates, as described, serve to correct for height of bursting when the first burst is too low, but do not work when it is too high, in

which case it would be necessary to use negative plates, that is, to lower the upper surface of the sight socket, which is manifestly impracticable. In this case the sight is replaced by the pointing arc, which will be described later.

Fig.ª 1.ª

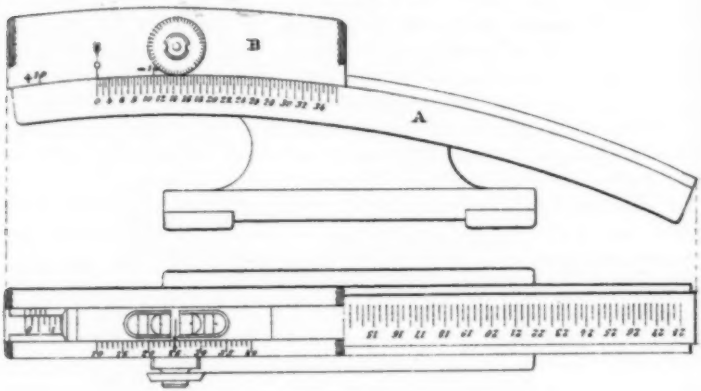


Fig.ª 3.ª

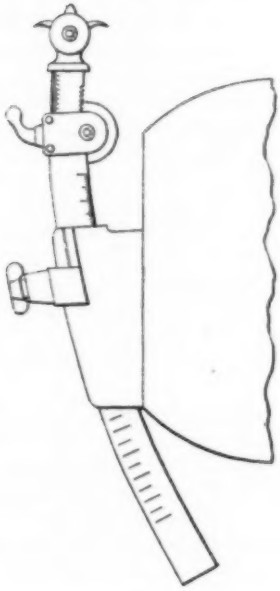
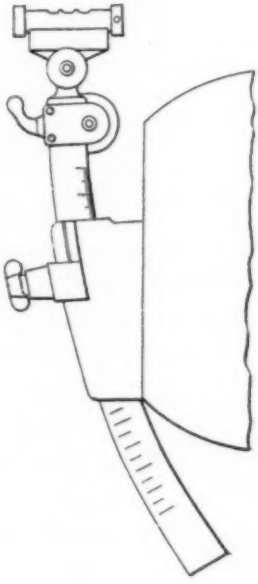


Fig.ª 4.ª



Indirect Aiming.—This is divided into two parts, elevation and direction.

The first is accomplished by the aforementioned "pointing arc." This instrument consists of a base sustaining an arc "A," on which slides a level arm "B," which, in its various positions, takes the inclination of the tangent to the arc at that point. (Figure 1.) As the base of the instrument rests on a shoulder on the piece, which is horizontal when the axis of the piece is so, the necessary elevation is obtained for each range by means of the graduation placed on one side of the arc. The index of the level arm is placed at the proper graduation and the elevating wheel turned until the level is horizontal, the graduations corresponding to differences of elevation. On the upper part of the level arm is another graduation of 30 divisions, 15 to the right and 15 to the left of the middle point, this point corresponding to the number 25, and the extremities to 10 and 40 respectively. An arrow on the level determines its position with reference to these graduations.

When the arrow is at 25, the graduations for range and height of bursting correspond; each division to the front represents one elevating plate added, and each to the rear, one removed. Consequently numbers below 25 represent negative elevating plates and afford a method of correcting for too great height of bursting. In this case the elevation is given by the arc even though direct aiming is used.

This "pointing arc" has also an angular graduation on its upper surface, and the level still another for correcting differences of level in the piece itself, formerly done by elevating strips. When this angle is excessive so that, taken with the correction for the elevating plates the 15 divisions on either side of the point of reference are insufficient, one of the indices, + 10 or — 10 is used in place of the central arrow, which is equivalent to the addition of 10 plates to either side.

For direction in indirect aiming, another new instrument is used called the "lining plane."

It consists of a rectangular base carrying on one side an alidade "H," which revolves about "O," carrying the indices for the arcs which are engraved on the shorter sides, from 0° to 30° and 30° to 60°. The alidade has two arms constructed as shown in Figure 2, p. 132. This lining plane is applied to the piece on three mortised pieces of timber corresponding to the two circular holes in the base and the axis of the alidade.

To give direction the captain selects some distant point of reference to the front or one side and directs the lining plane to be placed at the guns with the longer side in the direction of the axis in the first case, or at right angles in the second, since either method can be used. Pointing one piece in the probable direction of the target, the alidade is moved to the reference point, the reading taken, and all the other pieces, with their alidades at the same reading, directed on the same point. This done, reference stakes are placed for each piece for succeeding shots, and the

SHRAPNEL FIRE AT 2000 METRES.

Commands of the captain, and in parenthesis, instructions of the chiefs of section	Pieces.	Ranges.	Observations.	REMARKS
Percussion shrapnel, at battery in front, at 2000 metres, fire from the right.....	1	2000	—	The target is supposed to be a battery.
At 2400 m.....	2	2400	+	Load all pieces until the command for changing firing.
At 2200 m.....	3	2200	—	
At 2300 m.....	4	2300	—	
Time firing. Load for series, 2300 m. Commence Firing..	5	2300	—	
	6	2300	+	These pieces were already loaded with percussion at the command for changing the fire.
	1	2300	+	
	2	2300	—	
	3	2300	—	
(Cease Firing).....	4	2300	+	
(Length of Burning, 2300 m.)	5	2300	—	Two short at beginning of firing. Add one elevating plate.
	6	2300	—	
		2300	—	
Add one plate.....	1	2300	1 ?	Not having obtained the normal height, another plate is added.
Add another plate.....	2	2 2300	10 ?	
	3	2 2300	8 ?	The normal height is obtained, about 8 metres.
Next series at 2200 m.....	4	2	4	
		2200	—	
(Length of Burning, 2200)...	5	2 2200	3 ?	As two plates have been added the range has been increased 100 metres: Consequently it must be diminished by 100 m. to obtain the true shorter arm of the fork.
	6	2 2200	8 ?	
	1	2 2200	7 —	
	2	2 2200	2 ?	
	3	2 2200	9 ?	
Next Series at 2300 m.....	4	2	6	
		2300	+	Since with longer arm of fork the burst was over, it indicates that the previous range was right. Consequently the firing will be continued at that range.
(Length of Burning, 2300 m.)	5	2 2200	3 +	
2200 m. Load continuously...	6	2	2	

position of the wheels marked by a metal spike. These spikes are red and white for the odd pieces, and black and white for the others, in order to prevent the gunners mixing their own with those of the adjoining pieces.

The first shot having been fired, the captain computes the deviation

from the observation, and with this as a basis, prescribes a new reading for the plane, each graduation being equal to a deviation of 50 metres at a range of 3000. In this manner a fork is obtained on the deviations as well as the ranges.

Example of Shrapnel Firing.—In order to form a better understanding of the German firing regulations in their principal applications, see example on opposite page.

ITALY.

The firing regulations in force are dated 1893, the principal novelty being the application of the elevating quadrant to shrapnel and indirect fire.

Firing at Fixed Targets.—The following paragraphs give the principal regulations:

CONDITIONS NORMAL.

Shell Fire.—Firing to obtain fork of 50 metres. Generally a series of six shots with shorter range of fork.

Correction for series: ½ to ⅔ short against targets with slope of 1/1, the correction is 25 or 50 m. according to circumstances. If the first three or four shots have the same sign, a correction is made. If a correction of 50 metres is not sufficient, a new fork must be established.

Shrapnel Fire.—Firing to obtain fork of 100 metres. Testing the fork. Series of six bursts with mean range of fork to correct height of bursting. Series with increasing ranges and lower bursting points for comparison until an explosion too far away is observed, when the last series is taken as the proper one. Normal height of bursting for field pieces is half the range in hectometres; for mountain guns, the range in hectometres.

SHORT RANGES.

Firing is commenced without establishing a fork, the pieces coming into position, if possible, loaded with percussion shell and the sights set.

Testing the fork is accomplished by repeating a shot for each of the two distances which determine the fork.

The correction for height of bursting is verified by the elevating quadrant, which consists of the arc itself (Fig. 3) and a movable arm in which the arc works by means of teeth on the inner surface of the arc and a pinion on the upper part of the arm. The sight does not differ much from ordinary ones except that the edges, instead of being right lines, are arcs of a circle whose centre is in the axis of the trunnions. The outer movable arm has a graduation corresponding to the German plates. The graduations on the sight correspond to the distances in the table of fire when the arm is placed at the zero of its scale. The divisions on the arm are called points. Each point which the sight is raised above the socket by which it is attached to the piece adds 50 m. to the range, the same as an elevating plate, with the advantage over the German system that distances can be decreased from the origin as well as

increased. By elevating the sight one point and decreasing the range 50 m. we obtain what are called "compensating points," with which the distance does not vary.

Fig.e 2.a

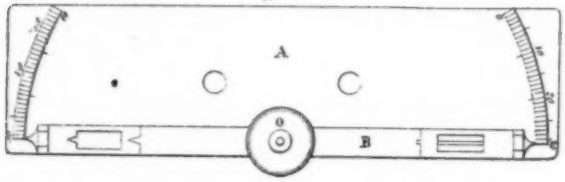


Fig.a 5.a

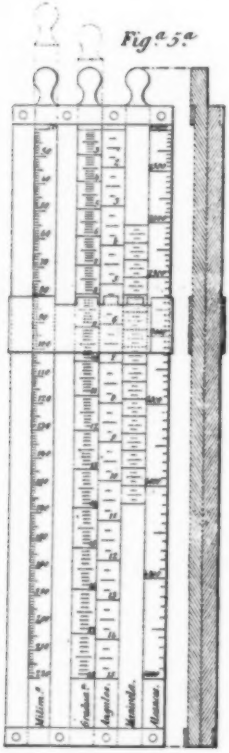


Fig.a 8.a

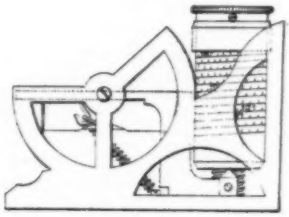
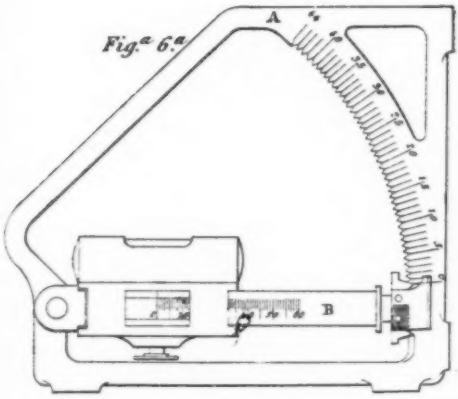


Fig.a 6.a



Indirect Aiming.—This elevating quadrant has the great advantage over other models that it can be used for indirect fire as well as direct (Fig. 4). A level is added and the elevation is given by getting the

EXAMPLE OF SHRAPNEL FIRING.

Commands and Instructions of the Captain.	Commands and Instructions of the Chiefs of Section.	Pieces.	Shots.	Observations.		Period of firing.
				Range.	Height.	
At battery in front, aim at 4th piece. Percussion fire at 2000 m. From the right, one shot.	All sections. Percussion fire at 2000 m. Deviation 2. 1st Section, 1st Piece, Fire.	1	1	—		Establishing Fork.
At 2200 m. 1 shot. 1 shot.	All sections at 2200 m. aim. 1st Section, 2d Piece, Fire. 2d Section, 4th Piece, Fire.*	2 4	2 3	? —		
At 2500 m. 1 shot.	All sections at 2500 m. Deviation 3. Aim. 3d Section, 5th Piece, Fire. 1st Section, Load.	5	4	+		
At 2400 m. 1 shot.	All Sections at 2400 m. Deviation 2. Aim. 3d Section, 6th Piece, Fire. Last Shot.	6	5	—		
1 shot.	2d Section, Load. 1st Section, 1st Piece, Fire.	1	6	—		Testing Fork.
At 2500 m. 1 shot.	All sections at 2500 m. Deviation 3. Aim. 1st Section, 2d Piece, Fire.	2	7	+		
Fire with time fuses, 2 points.† At 2350 m. Fire from the right. Commence firing!	All Sections. Time firing. 2 points height at 2350 m. Deviation 2. 2d Section, 3d Piece, Fire.	3	8	—(‡)		
	2d Section, 4th Piece, Fire. (3d Section ready).	4	9	—(‡)		
	3d Section, 5th Piece, Fire.	5	10	?	Very high	First Correction Group.
	3d Section, 6th Piece, Fire.	6	11	?	Very high	

* First piece not ready.
‡ With percussion.
† It is supposed known that there is a variation of 100 m. on account of delay in the burning of the fuse mixture.

EXAMPLE OF SHRAPNEL FIRING.—*Continued.*

Commands and Instructions of the Captain.	Commands and Instructions of the Chiefs of Section.	Pieces.	Shots.	Observations.		Period of firing.
				Range.	Height.	
Commence firing!	Round completed.					
	1st Section, 2d Piece, Fire.*	2	12	?	Very high	
	2d Section, 3d Piece, Fire.	3	13	?	Very high	
	All sections. Arm, o. 2450 m.					
Arm at O.	2d Section, 4th Piece, Fire.	4	14	?	Very high	First Correction Group.
At 2450 m.	3d Section, 5th Piece, Fire.	5	15	?	Very high	
	3d Section, 6th Piece, Fire.	6	16	?	Very high	
	Round completed					
	1st Section, 2d Piece, Fire.*	2	17	?	Very high	
	2d Section, 3d Piece, Fire.	3	18	?	Very high	
	2d Section. New Graduation.					
	2d Section, 4th Piece, Fire.	4	19	—	Normal	
	3d Section, 5th Piece, Fire.	5	20	—	Normal	
	3d Section, 6th Piece, Fire.	6	21	—	Normal	Second Correction Group.
	1st Section. Old Graduation.					
	1st Section, 1st Piece, Fire.	1	22	?	Very high	
	1st Section, 2d Piece, Fire.	2	23	—	Normal	

* First piece not ready.

3d Section, 1 point below zero, at 2600 m.†	3d Section, 1 point below zero, at 2600 m.					
	2d Section, 3d Piece, Fire.	3	24	—	Normal	Continuation of Second Correction Group.
	2d Section, 4th Piece, Fire.	4	25	—	Normal	
	3d Section, 5th Fiece, Fire.	5	26	—	Normal	
	3d Section, 6th Piece, Fire.	6	27	—	Normal	
	Round completed.					

† To determine whether the intervals of explosion are within convenient limits, the firing has been varied by 150 m., lowering the explosions to facilitate observation.

EXAMPLE OF SHRAPNEL FIRING.—*Continued.*

Commands and Instructions of the Captain.	Commands and Instructions of the Chiefs of Section.	Pieces.	Shots.	Observations.		Period of firing.
				Range.	Height.	
	1st Section, 1st Piece, Fire.	1	28	—		Continuation of Second Correction Group.
	1st Section, 2d Piece, Fire.	2	29			
	2d Section, 3d Piece, Fire.	3	30	....	Normal	
	2d Section, 4th Piece, Fire.	4	31			
	3d Section, New Graduation.					
	3d Section, 5th Piece, Fire.	5	32	+	Low	Verification of time firing.
	3d Section, 6th Piece, Fire.	6	33	+	Low	
3d Section aim at 0. at 2450 m.	3d Section, index at 0. at 2450 m. Round completed.					
Rapid fire.	The firing is kept up till the command Cease Firing.					

bubble in the proper position by the elevating wheel instead of aiming the line of sight directly at the target.

The Italian artillery obtains direction by the use of perpendicular and parallel lines, but have no special instrument to facilitate these operations on an extensive scale.

The perpendicular and parallel lines are verified by the use of the Gautier Telemeter, or of the "prism square," the latter being a single prism mounted in a metallic frame.

FRANCE.

A provisional manual for field artillery firing appeared in March, 1894. We are in ignorance of the text of this work and have only been able to discover certain details given below.

Firing at Fixed Targets.—The following paragraphs give the principal rules.

Shell Fire.—Firing to obtain fork of 50 metres. Testing the fork. Series of four shots with the mean range of the fork.

If this first range does not give two over and two short it is increased or diminished by 25 metres.

If the targets are not sunken, three short shots are allowed in the series.

Shrapnel Fire.—Firing with percussion to obtain fork of 100 metres; time firing with the mean range of the fork, and generally with one section, called the "guide section," firing with percussion.

The chiefs of the two sections executing time firing obtain the range from the guide section, and themselves correct for the height of bursting, using the range table for that purpose.

In correcting for height, the explosions are used in groups of two. If two successive groups call for corrections of a contrary nature, the mean is taken.

The normal height is equal to 4/1000 range.

If both bursts are very high or low the correction is $\pm 0.''4$.

Both moderately high or low, $\pm 0.''2$.

One high or low and the other good, $\pm 0.''1$.

When the captain thinks best, he causes the guide section to pass to time firing.

At ranges under 1500 metres, shell fire is used.

In testing the fork the following cases may occur, supposing it between 2000 and 2100 metres.

1	2	3	4	5	6
2050—	2050+	2050—	2050+	2050—	2050+
2100+	2000—	2100+	2000+	2100—	2000+
		2150+	1950—	2150—	1950+
Exact fork.		Distance to Target is 2100 metres	Distance to Target is 2000 metres	Wrong fork.	

The "converting board" consists of a light table on which is fastened three movable rulers, also of wood (Fig. 5), and graduated, and two other fixed graduations. Of these, the first corresponds to ranges and the other to angles, so there are on the board graduations corresponding to ranges, angles, graduation of fuse, turns of hand level and millimetres of height. A metallic index, which can be placed at any required point, serves to mark the relation between the different graduations.

When the movable rulers are in their initial positions the horizontal data correspond to the table of fire. When the conditions vary it will be necessary to move the rulers, thus giving the chiefs of section a method of correcting the graduation of the fuse.

In the order for loading, the captain simply indicates the range; the chiefs of section then move the index until it corresponds with the indicated graduation and read in the last column the number of millimetres, which they give in the command for aiming; at the same time they read and order the graduation of the fuse.

Indirect Aiming.—The quadrant level by which elevation is given to the pieces, consists of an arc "A," and an arm "B" pivoted at the centre of the arc (Fig. 6), being held in the direction of the radii by a spring ratchet. This arm carries a level which is fastened to it by a friction clamp screw.

The arc is divided into degrees, each one of which corresponds to a tooth

on the ratchet. The level can be given inclinations between these teeth by sliding it along the curved edge of the arm, which is graduated to minutes, fractional parts of which are estimated. For placing on the piece, the quadrant has two bases at right angles to each other.

The "reference rule" is used for direction. It consists of a graduated rule within which slides a stem. The rule has two arms, one fixed at the end to support the stem and the other movable, so that it can be secured at any point by a clamp screw. Another screw of the same kind is used to secure the stem in any position.

To use this reference rule, two pickets with properly shaped heads are placed on the same side of the piece, one opposite the wheel and the other at the height of the base of the breech. The fixed arm of the rule being placed on the first picket, the stem is drawn out till it touches the wheel and fastened in that position by the proper clamp screw. The position of the stem being thus fixed, the rule is carried to the second stake, and being placed so that the end of the stem touches the base of the breech, the movable arm is shifted until it fits on the head of the stake, when it is also clamped.

The piece having been once pointed in this manner, to point it again in the same direction, the fixed arm is placed on the first picket and the stem drawn out till it touches the wheel, when it is clamped. The rule is then taken to the second picket, on which the movable arm is placed, this not having been moved since the previous aiming, and the breech of the piece moved to the right or left until it touches the end of the stem. It may happen that in moving the breech, the distance of the wheel from the first stake may be changed, in which case the operation must be repeated until the distance from the end of the stem to the fixed arm remains unchanged. When it is desired to correct for a computed deviation, it is only necessary to change the movable arm one way or the other as far as may be desired. Indirect aiming by the two above-mentioned instruments, is verified by aiming directly all the pieces at a distant object not very far from the target, or by establishing lines to the front with pickets and plumb lines, and then applying the reference rule to each piece, while the elevation corresponding to the range is obtained by the quadrant.

Before commencing firing, the pieces are given the deviation which is considered best for each case, and the same course is pursued after the first and succeeding shots until the correct direction is obtained.

To give the pieces of battery the same direction when there is no prominent object in front near the target that can be used as a reference point, the firing manual recommends that a piece of the central section be aimed in the supposed direction of the target and a shrapnel burst obtained with a graduation less than that for the estimated range, so that the burst will be high. The five remaining pieces are then aimed at the cloud of smoke caused by the explosion.

Example of Shrapnel Firing.—The following example deduced from

the prescribed rules, gives an illustration of the method of procedure in shrapnel fire:

SHRAPNEL FIRE AT 1950 METRES.

Commands of the Captain.	Commands of Chiefs of Sections. 1	2	3	Piece.	Range.	Observa'ns	Remarks.
At 2000 m. commence firing. No. 1, Fire!	Height 50 m. m. Deviation 1.5 m. m.			1	2000	+	The six pieces are loaded with percussion shrapnel.
At 1800 m. No. 2, Fire!	Height 4.3 m. m.			2	1800	—	Each section reloads when the preceding one is commencing firing.
At 1900 m. No. 3, Fire!	Height 47 m. m.			3	1900	—	
At 1950 m. No. 4, Fire!	Height 48.5 m. m.			4	1950	—	Testing the fork.
At 2000 m. No. 5, Fire!	Height 50 m. m.			5	2000	+	Piece was already loaded.
				6	1950	—	
Keep 1950 m. 2d and 3d sections with fuse graduated.	Height 48.5 m. Fire as before		Graduate fuse, 5.″5.				Each section fires separately, the first following the rules for shell fire, the other two commencing time firing, taking the range each time from the first and correcting height of bursting.
1st section graduate fuse (when Captain thinks proper). Rapid Fire.	Fuse graduated to 4.″9						Takes the graduations as already corrected by the other sections.

ENGLAND.

The following regulations for field artillery were first officially published on September 1, 1893.

Firing at Fixed Targets.—In the following paragraphs are given the principal rules.

Shell-fire.—For the first range the telemeter is used. Obtain a fork of 50 yards. Testing the fork when it depends on a single observation. Series of three, four or more shots with mean range of fork.

For raised targets, ½ should be short; for sunken targets, ⅓ to ¼ short. Corrections made by 25 yards. If the three first shots have the same sign, a correction is made.

Shrapnel Fire.—Firing with shell for fork of 50 yds. Time firing with the mean range of the fork, the captain directing the graduation of the fuse.

With pieces in which the shell and shrapnel are of different weight, this difference is allowed for in passing from one kind of fire to the other.

The bursts are corrected for in pairs. If the first pair strike before exploding, the time is shortened until bursts are obtained.

As an illustration of testing the fork, we may suppose it effected in the following manner:

4400 + 4300 —
4000 — 4350 —
4200 —

In this case as the entire determination of the fork depends on the observation corresponding to the first range, it must be verified by another shot.

England is the only nation which even mentions the use of the telemeter for correcting fire, as although Italy has a prescribed model of such an instrument, its actual use is limited to instruction in estimating distances and establishing alignments.

Indirect Aiming.—For elevation the Watkin range-finder is used, which consists of a framework carrying a cylinder and level (Fig. 8).

The latter revolves on an axis, one end of which is supported by a helical spring fitted to the cylinder. The various inclinations of the level when it is made to revolve about the cylinder are marked on this by graduations, the divisions corresponding to five minutes.

This range finder has two bases at right angles to each other, so that it can be applied to the upper surface of the breech or to the face of the piece. There does not seem to exist in the English artillery system any special instrument for giving direction in indirect firing, except by the use of the pickets and plumb-lines necessary to establish alignments.

Use of Shrapnel Fire.—As an illustration of this, we give the following table.

SHRAPNEL FIRE AT 2875 YARDS.

Number of Shot.	Number of Piece.	Elevation Yards.	Projectile.	Graduation of Fuse.	Observation. + — or ?	Observation. Height of Bursting. Feet.	Commands of Captain given after observation of the shots.
1	6	2800	Shell	....	—	.....	
2	5	3000	Shell	....	+	.....	
3	4	2900	Shell	....	+	.....	Central section prepare
4	3	2850	Shell	....	—	.....	for shrapnel fire, fuse
5	2	2875	Shell	....	—	.....	graduated at 14 (cor-
6	1	2875	Shell	....	+	.....	responding to 2800
7	6	2875	Shell	....	—	.....	yards).
8	5	2875	Shell	....	+	.....	Continue firing at 2875
9	4	2875	Shrapnel	14	....	40	yds.
10	3	2875	Shrapnel	14	....	32	(Explosion too high)
11	2	2875	Shrapnel	14½	....	Struck	Right section fuse 14½.
12	1	2875	Shrapnel	14½	....	10	(Explosion too low)
13	6	2875	Shrapnel	14¼	....	24	Left and central sections fuse 14¼.
14	5	2875	Shrapnel	14¼	....	16	Correct explosion, Keep fuse at 14¼.
15	4	2875	Shrapnel	14¼	....	22	Regular firing com-
16	3	2875	Shrapnel	14¼	....	17	mence with second piece.

COMPARISON.

An examination of the firing regulations of the principal European nations, as given in the preceding pages, shows a marked tendency in the direction of making corrections in firing more simple, rapid and safe. Those long series of eight and even twelve bursts have entirely disappeared, as laid down in the old German, Italian and French firing regulations, the management of which was such a strain on the mind. The actual series at present, as we have seen, goes as low as two, and never exceeds six. Modern fire-arms, both magazine small-arms and rapid-fire guns, and an extended experience in manœuvres on a grand scale, have awakened attention to the fact that in an actual combat, the most elaborate calculations based on the doctrine of probabilities would be useless unless they are reduced to a set of rules, short and few in number, which, when once learned, can be applied in an almost automatic manner. In place of seeking the greatest accuracy of fire at a sacrifice of speed and rapidity, these latter must be put first and we must be satisfied with a reasonable amount of accuracy.

We must not suppose, however, that simplification of rules and ease of execution are necessarily synonymous, as it frequently happens that rules easy to learn are difficult of execution. Nothing could be more simple than the English rules for shrapnel firing, as shown in the example given, which is taken from the field artillery drill book, provided everything should happen in actual practice as is laid down in the illustration in question. But we must bear in mind that these rules are the result of instruction in time of peace, and the result might be very different in an actual combat.

All the regulations referred to show a lack of confidence as to the determination of the fork. General Rohne, who has examined a great number of reports of firing extending over many years of constant practice, found a considerable number of false forks, the use of which led to much loss and inaccuracy in the firing based upon them. For this reason he considered it always necessary to verify the fork, even though it might result in some loss of time. We have seen that it is verified in France, Italy and England, while in Germany, whatever guns may be already loaded when the fork is determined, are used for testing it. With the exception of England, all countries have so arranged that the orders of the captain as to the firing shall simply indicate the range, to the absolute exclusion of heights of bursting, angles of elevation or length of fuses.

The methods of converting these ranges into angles and times are laid down in the regulations of each country. Germany does it by graduating in ranges both the pointing arc and the fuse, and allowing for the variation between them by means of the elevating plates. Italy obtains the same result by the elevating quadrant, while France settles it by leaving it to the chief of section to reduce the range into millimetres, degrees and seconds.

The system followed by Italy may be considered as a step in advance from the elevating plates, which have many opponents even in Germany itself. We do not know whether the Italian fuses are graduated to distances, but unless they are, the only thing *gained* is to transfer one more care from the captain and add it to the already overworked chief of section. This transfer has been done in France to a greater extent, but in a much simpler manner, by the adoption of the converting rule. Attention is called to the analogy between this in one of its applications and our own "time rule."

For indirect aiming all four countries use the spirit level for elevation in instruments independent of height of bursting, except in Italy, where the very ingenious gunner's quadrant is used for all purposes.

These elevating instruments all have bases less than two decimetres in length, and as precision depends greatly upon the exact adjustment of this short base to the gun, an adjustment which must be renewed after each shot, some idea may be formed of possible errors when we consider that a difference in level between the base ends of ½ millimetre produces a longitudinal deviation of some 50 metres at a range of 2000.

It is evident that in the construction of this class of elevating instruments, much ingenuity has been displayed to diminish the errors in graduation by increasing the space between divisions either by using an arc with very long radius, as in Germany and Italy, or by the aid of a spring, as in England, but the error due to its adjustment to the piece have been more or less disregarded. From this point of view, the Italian is the most imperfect, then the English, French and German, in the order given.

A similar defect is to be found in the German "lining plane" for giving direction; an error of 5 mm. in its location gives a lateral deviation of 30 metres at a range of 2000.

The French "reference rule" calls for a very complicated operation, by which the laying of the pieces depends upon a series of computations unsuitable for artillery in the field; the same can be said of the use of the prism and Italian telemeters.

We have made this comparison to embrace only the systems of other countries; to make it complete, these should be compared also with our own. This latter is something which should come as a result of the course at our Central Firing School, and should be made by the officers who have taken part in that course.

SOME CONSIDERATIONS ON THE SUBJECT OF MUSKETRY FIRE AND MUSKETRY TRAINING.

By General H. R. BROWNE.

(*Journal of the United Service Institution of India.*)

HARDLY any one who has given attention to the subject will be inclined to deny that the result of musketry fire is, when on actual service, disappointing.

Whatever the improvements have been—and they have been many and great—in arms, ammunition and individual training, and however high the standard of shooting at targets and upon ranges may be, the practical effect in war, in view of the ratio of killed and wounded to the expenditure of ammunition, seems to be very much what it was fifty years ago.

That modern arms are capable of inflicting tremendous losses in comparatively short periods of time recent wars have certainly shown. But they have not shown that those losses indicated any great advance in accuracy or control and economy of fire. Statistics, if they could be obtained, would probably point to an opposite conclusion.

Human nature being what it is, extreme rapidity of fire is almost necessarily destructive of control and destructive of accuracy; the effect of such fire depending rather on its volume than its direction.

If this is admitted, a serious question arises, *i. e.*,—Is there any advantage in great rapidity of fire or in the possession of arms constructed to deliver this high rate of fire?

And this may be followed by a second question—What is the maximum rate of fire that can be kept under control and delivered with reasonable accuracy by soldiers in the ranks?

As regards the first of these questions, the chief point urged by the advocates of magazine arms, which are of course associated with rapid fire, is that in moments of great urgency an overwhelming fire can be produced before which nothing can stand.

Theoretically the argument is sufficiently good; but if in practice the bulk of this fire is wild, unaimed, and uncontrolled, the theory has but little to recommend it. As to its annihilating properties, the history of recent wars hardly shows that it has ever possessed them.

It can hardly be doubted that more deliberate fire, under moderate control, would have greater effect.

"Moderate" control is a term used advisedly, for under the circumstances of close and severe fire, control can never reach any higher degree than that of giving a fairly good general direction to fire and preventing useless waste of ammunition. If it attains those points, and they will only be attained by previous instruction and practice, all reasonable exceptations will be fulfilled.

Excepting these occasions of urgency, or "supreme moments," as they are sometimes called, there can be no pretense for the necessity of extremely rapid fire or of any advantage that could accrue from it.

Steady, well directed fire, well under control, is under all circumstances the object above all others that it is desirable to attain. The nearer it is attained the greater must be the effect, and that will in all probability be a double effect, *i. e.*,—"increased loss to an enemy: decreased loss on its own side." The converse is the case if fire, whether from excessive rapidity or other cause, is ill-directed and ill-controlled.

As to the second question, the rate of fire that can be maintained with fair accuracy by soldiers in the ranks and be at the same time under proper control is very much less than is generally assumed.

At a target, all things being favorable, from seven to nine rounds per minute may be fired from a single breech-loader and from 12 to 15 from a magazine rifle by an individual soldier in ordinary uniform. If the same man is in the ranks with others, the rate of his fire will be reduced. If he is in full marching order, the rate will be again reduced. If tired and fatigued by marching, by cold or heat, or any of the numerous causes that affect his normal condition, his rate of fire will be further reduced. All these causes are in constant operation in war, all tending to the same answer to the question, viz., that the rate of fire that can be maintained to good purpose by soldiers in the ranks and in action is not very high; five to six rounds per minute from well-trained men is probably in excess, even under fairly favorable conditions; and if control is to be effective, it is certainly in excess.

Whether magazine arms or single loaders are used, matters little. Fire, to be well directed and well controlled, cannot exceed a certain rate, and that rate is not one of great rapidity.

Within the last few years increasing attention has been paid to the subject of control of fire, yet its importance is far from being fully appreciated or understood, notwithstanding that it is the very essence of effective fire. "Control" is not altogether a sufficiently comprehensive word, for it is not enough that fire should be "kept in hand" commencing and ceasing when desired; it must also be closely superintended and directed. The expression may, however, be accepted as generally understood.

In order to be effective, "control" must be decentralized. The executive unit must be a small one, that is to say, that the actual ordering and superintending of fire must be confided to the commanders of small bodies of men. Probably the best executive units are the sections of companies; their commanders being the sergeants or corporals in charge; superintendence being carried on by the captains, aided by their subaltern officers; the regimental commander giving a general direction only.

If this principle is a sound one, it ought to be assiduously practiced in peace, so that it may acquire the force of habit. The natural tendency is to feel that things done personally are better done than by deputy, and

the difficulty is to learn to have confidence in the deputy. It seems a simple thing enough, but it is not any easy one in carrying on fire. The colonel must trust to his captains and the captains must trust to their commanders of sections. In no other way is real control possible in action.

At the same time it will not do to lay down "hard and fast rules," for, in the ever varying situations of war, occasions may readily be conceived in which it might be desirable that the captain of a company or even the commander of a regiment, should himself direct the fire of his men.

In the application of a general principle something must be left to the judgment and discretion of responsible officers.

There has been a good deal of controversy on the question of the relative merits of volley and independent firing; each, however, has its appropriate place.

In all firing lines, that is to say, lines of soldiers in loose and extended order, whether skirmishing or attacking some fixed position, the fire must, almost of necessity, be independent,—in other words maintained by soldiers individually, though still superintended by the company officers and non-commissioned officers.

And it is again almost a necessity that fire at short ranges should be independent; for as distance lessens and fire becomes more severe and intense, so the power of steady control, indispensable to volleys, also lessens until it pretty nearly vanishes: theoretically it should exist unchanged to the last; practically it never can.

Steady firing in volleys will no doubt produce the best results for all purposes during action so long as the distance and intensity of opposing fire admits of effective control, clear observation, and collected orders.

Small detachments may, even under the most pressing circumstances, be able to maintain this control till a very late moment. But that cannot be expected when large numbers of troops are seriously engaged.

The question is, at what point will it usually be advisable to change from volleys to independent firing? In all probability the best answer is that the change should be made as soon as the distance is reached at which no alteration of sighting is necessary, *i. e.*, between 200 and 300 yards according to circumstances.

A subject closely connected with effective rifle fire is the eyesight of the soldiers in the ranks. A large percentage of our men undoubtedly suffer from defective vision, the causes of which are explained in a very able paper by Surgeon-Major H. R. Whitehead, published in the "Journal of the Royal United Service Institution" early in 1896; attention being again called to the subject by Surgeon-Major B. M. Skinner in the *Journal of the United Service Institution of India* in January of the present year. The fact therefore rests upon the evidence of medical officers of standing and experience.

Up to recent years it was not perhaps of any great consequence; but now that accurate weapons of great range and some delicacy are placed in the hands of our soldiers, it becomes a question of importance requiring to be dealt with.

No army can afford to reject as recruits all those whose vision has imperfections, or to discharge such men from its service; neither would it be desirable to do so; for shooting is, after all, only one of many qualifications that go to make the rank and file of regiments what they are and have been, as the pages of history will tell.

Many gallant and good soldiers may, from causes that cannot be remedied, be indifferent shots yet their courage and steadiness and example may be of the highest value.

They cannot be spared. Something, however, might be done in regimental organization so as to secure the best attainable results from the arms of the present day.

Special companies might be formed on the principle of the "old flank companies," composed of men of ascertained thoroughly good sight, both by day and by night, with a view to their employment in war on such duties as could not safely be entrusted to soldiers whose sight is imperfect.

In times of peace, a classification should, in any case, be made and carefully kept up and revised in every corps, if only as a matter of justice to the exertions of officers to train their men and the endeavors of the men themselves to profit by that training.

It is probable that considerable numbers of our rank and file are incapable of attaining more than very moderate proficiency with the rifle, and neither they nor their instructors are in any way to blame for it.

The subject is at least deserving of full investigation.

The instruction, or rather the system of instruction, in the use of the rifle, although greatly improved in recent years, is not sufficiently practical.

Perhaps it is as good as any that can be desired for the teaching of recruits. But why a soldier once trained to understand his rifle and the best method of using it should go through the same routine year by year during his service is a question not admitting of a satisfactory answer.

At present there is but little in the annual instruction of our rank and file to fit them for the use of the rifle on service, excepting only the so-called field firings introduced within the last few years; all the rest is range practice under favorable conditions carried on chiefly with the object of attaining a high figure of merit for the company or regiment.

Something not far short of one-half of the rules to be observed in musketry training and of the consequent returns, reports, and correspondence are directed to this figure of merit, and the prevention, as far as may be possible, of irregularities in relation thereto.

But the highest attainable figure of merit is no indication whatever

of the "service value," in respect of rifle fire, of the instruction given and received.

It may indeed be quite otherwise. A high figure of merit obtained on ranges may be the result of little else than the care that has been taken to instruct in details and to avoid as much as possible all the disturbing causes incident to war.

These cannot all be assimilated in peace, but if not all, still some might be.

In the annual course of the trained soldier it ought to be sufficient that a limited number of rounds of ammunition should be expended in ordinary range practice—20 or 25 at the most—merely with the object of ascertaining that the soldier's early instruction is not forgotten, and it would be well also at this period to note the condition of eyesight which may vary considerably from year to year.

The rest of his annual firing should follow on fatigue and exertion, such as marching, running, climbing hills, crossing broken ground, a night, or a few hours on outpost, etc., all of which are easily practicable. Bad weather and bad or indifferent ammunition should be accepted as they come.

And above all both firing and the previous exercise should take place in the full marching order dress in use in the climate where the soldiers may be serving.

The efficiency of a corps should be tested, not upon simple shooting at targets, but upon what is done under conditions assimilated as closely as possible to actual service; and there is or should be no difficulty about obtaining these conditions.

Since the introduction of long range arms, the practice of judging distances accurately has increased greatly in importance; and here again the necessity for attention to "eyesight" of soldiers becomes evident. Medical evidence shows, beyond doubt, that a considerable percentage of the men in the ranks of regiments do not and cannot distinguish objects clearly at anything approaching the distances at which they may be called upon to fire; it is a matter the investigation of which ought not to be delayed.

Only within the last few years the discovery was made that large numbers of men in positions of responsibility as regards the public safety, guards and drivers on railways, pilots and officers of vessels were so defective in sight, many being absolutely color-blind, that they could not distinguish one light or signal from another. The discovery resulting in strict and careful examination and testing.

Surely the duties devolving on soldiers need equal precaution.

As to the ability to judge distances, assuming that eyesight is fairly good, the present mode of instruction seems hardly calculated to give the best results on service.

It is carried on far too much on known ground and under conditions that hardly vary from year to year.

It may be well that a certain amount of instruction should be given in detail in the ordinary way. But the bulk of a trained soldier's practice should be on unknown ground, alternately hills, valleys and level ground; and frequently during a march on any objects that present themselves in any direction, distances being afterwards measured as nearly as circumstances admit.

Practice should also take place in different lights. The light at daybreak and that at sunset is different, leading to considerable errors.

Estimates of distances by star or moonlight would be a useful practice in respect of outpost duty at night.

Above all, it is most necessary that those who have the responsibility of controlling and directing the fire from the ranks should themselves acquire the habit of quickly and rightly appreciating distance under varying conditions.

The several methods of firing ought to be considered chiefly with reference to active service.

Perhaps the first and most necessary point is that a soldier should be able to shoot with ease and accuracy from any position or situation in which he may be placed, either standing or kneeling or lying down on any kind of ground, amongst woods or rocks, behind barricades—through loopholes, making the best of available cover. To facilitate his movements, practice in time of peace is needful, and there should be no difficulty in affording it if suitable ground is selected over which individual soldiers can make their way, directing their fire on objects previously pointed out to them.

The steadiest fire that can be obtained from closed ranks is probably that from sections of companies, both ranks kneeling. The commanders of sections thus disposed are able to maintain very effective control; they can look well to their men, and at the same time observe all that is going on amongst their opponents. They cannot well do this if either one or both ranks are standing. Besides, there is the advantage of offering a greatly reduced target to the action of an enemy; excepting perhaps, in the case of firing steadily in volleys with both ranks kneeling, there can be little doubt that the fire of the second rank has a disturbing effect, tending largely to inaccuracy and waste of ammunition.

A question well worth consideration is whether it would not be better under most circumstances to confine fire to a single rank. The second or supplementary rank lying down would suffer less loss and be ready to continue fire if ammunition fell short, or to fill vacancies from casualties amongst their front rank men. The volume of fire from a single rank is of course less. But by increased steadiness and accuracy the effect would in all likelihood be equal if it did not exceed that from two closed ranks firing simultaneously; expenditure of ammunition being very greatly reduced.

Firing at all from a standing position is open to the great objection that exposure to loss is of necessity greatly increased, more especially in

reference to the high velocities and consequent flat trajectories of modern projectiles.

At times, and under particular circumstances, it may be necessary for soldiers to fire standing up, but it is a position that should be avoided as far as possible. As a general rule, it offers no advantage, it entails needless loss, and what is of no small importance is that the company and sectional commanders stationed in rear are in a great degree prevented from observing and directing the fire of their men.

SIR EVELYN WOOD ON CAVALRY.*

(From the United Service Magazine, London.)

IT is remarkable, and a fact upon which we may congratulate ourselves, that our three most distinguished and experienced soldiers of the present day, are all writers of more than average capacity. Lord Wolseley, Lord Roberts, and Sir Evelyn Wood, have of late added considerably to our store of literature, and while the former's "Life of Marlborough," in the charm of its style and as a carefully worked out record of events, can hardly be surpassed, and fills us with hope that its gifted author may some day have leisure to complete it; Lord Roberts' "Forty-one Years in India" shows us that its distinguished writer possesses a merit, which few autobiographers can boast of, for while the work is delightfully readable and interesting, the author effaces himself throughout with rare modesty and absence of egoism, while he gives credit with no sparing hand, where credit is due, to everybody but himself.

Lord Wolseley's "Decline and Fall of Napoleon," with its concise and masterly account of the celebrated campaign of 1814 in France, and Lord Roberts' "Rise of Wellington," have also gained a well-deserved success, and have excited the attention of readers and students of military history in many countries, while Sir Evelyn Wood's "Crimea in 1855 and 1895," his "Cavalry in the Waterloo Campaign," and the work which is especially the subject of this review, afford not only charming reading to the civilian as well as to the soldier, but also to the latter are full of instructive lessons, to which the distinguished services, the great experience, and indomitable energy of the author lend especial weight. In "Cavalry in the Waterloo Campaign" Sir Evelyn completely explodes the commonly accepted story, that the army of Napoleon which crossed the Sambre on the 15th June, 1815, was the best or one of the best he ever commanded. Nearly twenty years of war, and especially the terrible Russian campaign of 1812, had destroyed most of the men of Marengo, Austerlitz, and Jena; while out of 187,600 horses

*"Cavalry in the Waterloo Campaign." Sampson Low, Marston and Co. 1895. "Achievements of Cavalry." George Bell and Son. 1897.

which crossed the Russian frontier in June, 1812, only 1600 returned to France. In fact the deterioration of the French cavalry in subsequent campaigns was one of the principal causes of Napoleon's want of success. In 1815, the cavalry and artillery horses, which had been collected, owing to the marvellous exertions and energy of the French emperor, during the hundred days, were for the most part underbred and half trained, while the vast majority of the men of both branches, were little more than raw recruits, and many of the old soldiers of the republic, who rejoined the ranks of the army, were sixty years of age. Nothing could exceed the bravery displayed by the French cavalry in this short campaign, but their small raw horses were no match whatever for those of the English cavalry, as was clearly shown at Jemappes during Wellington's retreat from Quatre Bras on June 17th. One can only feel amazed that the former accomplished so much, which speaks volumes in praise of the courage and devotion of the men, and the skill and dash of their celebrated leaders, Milhaud, Exelmans, Pajol, and Kellermann. "Cavalry in the Waterloo Campaign" first appeared as a series of articles in the *Pall Mall Magazine*, as also did Wolseley's "Decline and Fall of Napoleon"; and Roberts' "Rise of Wellington." Sir Evelyn has, as he tells us, "been induced to enlarge the *Pall Mall Magazine* articles to a greater length than was permissible in the pages of a monthly magazine." We congratulate ourselves that he was induced to do so, and that thereby he has produced a work which, with his "Achievements of Cavalry," should be found in every military library, and which should be studied by all cavalry officers, showing, as they do, what deeds can be accomplished, by leaders who possess the essential attributes of a cavalry commander at the head of men who are devoted and brave. Sir Evelyn's account of the battle of Waterloo, though naturally mainly devoted to the action of cavalry, is exceedingly clear and easy to follow, and, as in the case of all recent works on the subject, creates amazement that the hastily raised and half trained French army fought as it did, being opposed by one nearly equally strong in a defensive position in its front, and threatened most of the day, and attacked in the afternoon on its left flank by the Prussians, to stop whose progress Napoleon had to detach a whole army corps (Lobau's) and a considerable part of his guard. How his available strength for attacking Wellington was thus reduced, and how his chances of success in this direction were diminished, must be apparent, though this important factor is generally overlooked by superficial readers of the campaign, who conclude that because on the morning of the 18th Napoleon disposed of a somewhat larger force than Wellington, the latter succeeded in defeating the attacks of numbers which were superior to his own throughout the day. Sir Evelyn Wood puts down the allied force as 68,000 men with 156 guns, and the French at 66,000 and 242 guns. Lord Wolseley states that Napoleon brought into the field nearly 49,000 foot, 15,700 horse, and 246 guns, and Wellington, not including the 18,000 men detached at

Hal, over 49,000 foot, 12,000 horse and 146 guns; so that we may take it, that with the exception of artillery, in which the French army was greatly superior, as all first-class powers are now, to us in the strength of that arm, the two armies that stood opposite to one another when the first shot was fired soon after 11 A. M., were practically equal, while the Prussians who gradually arrived within striking distance between 4.33 P. M. and 7 P. M., numbered 41,283 foot, 8858 horse, 1803 artillery, and 104 guns (Siborne).

Six out of the twelve chapters, describing so many achievements of cavalry, first appeared in the pages of the *United Service Magazine*. They have now been expanded. It is rather disappointing that not one purely English exploit is included. The 15th Light Dragoons were present certainly at Villers-en-Cauchies, and performed prodigies of valor, but they only formed half of the force which was made up by the Leopold Austrian Hussars, the force being commanded by Colonel Baron Sentheresky and guided by Captain Mecsery of the Archduke Ferdinand's Hussars. This brilliant action, in which two Austrian and two English squadrons, attacked an enemy in position, and dispersed a force of 3000 men of all arms, captured three guns, and for which the Emperor of Austria bestowed on every officer engaged a gold medal and the order of Maria Theresa, carrying with it the rank of baron of the empire, is graphically described by the author, who thus concludes the chapter on this episode:

"The victory was gained by the determined resolution of a small body of horsemen, and is a fine example of what may be effected by a brave, well mounted and well trained cavalry, under favorable conditions, when the leaders are not only resolute but are also skilful. The French infantry were armed with an indifferent musket, which could only be reloaded slowly. The men were apparently raw levies and must have been bad shots, as the allied loss was small, although the fighting was mainly hand to hand. The formation of infantry in one large body was very unfavorable for defense."

We have two object lessons here, first that well-led cavalry will always have their opportunities, and secondly that a solid mass of infantry is now, more than ever, a very unfavorable formation. The greater part of its fire effect is lost; and though it may give confidence to inferior troops, it is a fatal mistake to adopt it, with those who can be relied upon, and who are armed with modern arms of precision. Prince Kraft, who was in no less than sixty battles and skirmishes, urges the total abandonment of the square formation for all good infantry like the Germans, and expresses astonishment that the English should have moved in the Soudan in great squares, "though fighting with savages who were miserably armed." He states that an infantry if not sufficiently skilled in shooting and thus wanting in confidence in their rifles, may very possibly be compelled in future to revert to the square formation. Sir Francis Grenfell, when Sirdar in Egypt, had the courage to abandon

the square formation, which had been adopted, owing apparently to the annihilation of Hicks Pasha and Baker Pasha's Egyptians, and his success at Ginniss proved how sound and correct his judgment was.

Sir Evelyn quotes a vast number of authorities, whose works he has consulted, which lends additional weight and interest to his books. The principal lesson which he seeks to inculcate is that the days of cavalry are by no means over in any respect, but that on the contrary the sphere of its usefulness is very much extended; not only does the safety and success of its army depend upon the efficient carrying out of reconnaissance duties by it; but provided it is led by a man who, like Kellermann, possesses indomitable courage, quickness of perception to enable him to seize the exact moment for throwing his command on the enemy, and ability to inspire his troops with his own determination and confidence in his leading, will have as great opportunities of success in charging as had the French cuirassiers of the First Empire.

Sir Evelyn dwells on the great importance of cavalry leaders being men of nerve, who will act at opportune moments on their own responsibility and without waiting for orders. He is undoubtedly right; an intimate knowledge of the contents of all our red books, and any amount of academic instruction in the art of war, will not enable a timid man who is fettered with red tape and fear of responsibility, to win a great victory or obtain signal results, any more than ignorance of the art of war and its history can be made up for by mere dash and bravery, however great they be. We do not want our officers to be bookworms, neither is it desirable that they should look upon sport as the most important object of their lives in the service. It is greatly to be regretted that it has been found necessary, owing to the enormous expenses of life in our cavalry regiments, to make the standard of examination lower than it is in the other services. One can hardly conceive any position in war that requires more thorough and sounder professional knowledge, than that of officers of cavalry covering an army in an enemy's country. The Germans appreciate this fact thoroughly, and their cavalry officers are as accomplished professional soldiers as any in the army; and that they possess in a very high degree the dash, and other qualities which make the cavalry leader, Sir Evelyn Wood shows us, in his charming descriptions of their exploits at Benetek and Tobitschau in the war of 1866, and of its splendid self-sacrificing feats of valor at Mars-la-Tour, and Vionville on the 16th of August, 1870, when, in the first case, the 1st Dragoon Guards, led by Colonel von Auerswald saved the remains of the 38th Infantry Brigade, which had recklessly put forward to the long ravine which separated the French right and the German left. This charge, which cost the dragoons, who rode into it with only three squadrons, fifteen officers, 123 men and 216 horses, was, as Sir Evelyn writes, "well worth the sacrifice, for it enabled the shattered 38th Brigade to rally; the French advance was arrested and the Prussian batteries were enabled to withdraw south of the Vionville Mars-la-Tour road, whence

they again opened fire on the French, who retired to the north bank of the ravine."

A most interesting and detailed account of the advance of the 38th Brigade against the French divisions of Generals Grenier and Cissy, and of the charge of the 1st Guard Dragoons, is given by Hönig in his "Taktik der Zukunft," pages 122–163. Hönig was an officer in the 38th Brigade, and his description of this portion of the battle, and especially of the deeds of the dragoons, commends itself to the study of our cavalry officers.

Sir Evelyn concludes the "Achievements" with a relation of the magnificent charge of Von Bredow's Brigade, in which three squadrons of the 7th Cuirassiers and three of the 16th Uhlans, at a most critical period, when Canrobert's advance in force threatened to overpower the infantry, and sweep it off the field, charged a whole army corps, wrecked six batteries, and dispersed four battalions, after which they were attacked by Valabrègue's cavalry division and Murat's brigade, whose horses were quite fresh, there numbers being estimated at from 3100 to 3300. A wild *mêlée* ensued, in which the Germans were for a time hidden from view in a sea of hostile horsemen; and then the barrier burst and a few groups of the Teutons cut their way through, and at last obtained shelter south of Tronville. Hardly a hundred men were mustered here, the cuirassiers having lost 7 officers, 198 men and 261 horses, and the lancers 9 officers, 222 men and 224 horses. The French cavalry was no doubt badly led, and remained for too long inactive in rear of the infantry, or it is difficult to see how a man of the gallant Bredow Brigade could have escaped. This charge was even more worth the sacrifice than the exploit of the 1st Guard Dragoons, for had Canrobert's advance been continued, followed on his right by Ladmirault's corps, nothing but a miracle could have saved the day for the Germans.

One extraordinary but little known feat of cavalry is not mentioned by Sir Evelyn, namely the charge of Doumerc's cuirassiers at the battle of the Beresina, on the 29th of November, 1812, during the disastrous retreat of Napoleon from Moscow. On the 28th most of the French army crossed the river, Marshal Victor being left with the rear guard on the right bank. The next morning the Russians under Tchitchakoff attacked vigorously, and drove in Oudinot and Ney upon the young guard, which also fell into confusion; the battle seemed lost when Ney ordered Doumerc to charge, which he did with such effect that he took 1500 prisoners, four guns, and drove the Russians back on Stachow, from which they did not attempt any further advance that day.

Sir Evelyn's "Achievements," very rightly as the name implies, tell us only of deeds which resulted in success, and having fully dwelt on the action of the cavalry of both sides in his "Cavalry in the Waterloo Campaign" he does not repeat the account of the charge of the Union Brigade at Waterloo. Neither does he tell us of the charge of the Light Brigade at Balaklava, where splendid courage and devotion was shown,

because, as to results, it was a failure, and the sacrifice of life was owing to a mistake!

The charges of the French Cavalry at Wörth and Sedan could not be surpassed in gallantry, but they were complete failures, principally because they were made on ground entirely unsuited to cavalry movement.

Sir Evelyn concludes with a chapter on mounted infantry, which he looks upon as a very valuable arm; and this doubtless it is, in countries where cavalry cannot be largely employed. It is somewhat curious that in 1804 General Baraguay d'Hilliers persuaded Napoleon to adopt, what Marbot calls, this "système batârde." The result was unfortunate, the mounted infantry could not fight against infantry, and they were beaten by cavalry. General Baraguay fell into disgrace with the Emperor, from which he never recovered, and the latter abolished the system. It seems that while the value of such an arm like that of machine guns is of such problematical worth in European warfare that the Germans, who possess doubtless the best and most practically clothed, armed, and equipped army in the world, will have nothing to say them, the benefits that are derivable from their use in fighting the class of enemy that our troops have as a rule to meet, is incalculable.

A PLEA FOR SPEED IN FIRING WITH GARRISON GUNS.

By Major General J. B. RICHARDSON.

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THE fact that, unless guns used in coast defence are extremely rapidly served, they are now-a-days of little practical use does not appear to be as yet sufficiently recognized. Probably the miserable slowness of fire obtaining among coast artillery is largely due to very difficult peace conditions. Nobody likes the noise and concussion of their guns, and only those who have to make arrangements for the very small amount of practice available know the hundred and one objections and difficulties thrown in the way of garrison artillery getting a "free shoot" in a large majority of our forts; or the amount of worry and correspondence entailed before a gun can be got off at all. But want of speed in working is not wholly due to this, for the garrison artillery themselves, as a body, can hardly be said to have realized the absolute necessity of rapid work against modern ships. It must be admitted that they too frequently display a remarkable indifference to the lapse of time when, at last, an opportunity offers for pouring in fire, and a want of true smartness in the division of responsibility and in combining the many small operations, either necessary or imposed upon them by too complicated tools, which have to be performed before a shell can bury itself in an opposing ship. That of late years they

have ceased to improve the material with which they work, and by improving it to cut out useless and time-absorbing operations, is much to be regretted, for it is generally by the small and simple inventions and improvements of actual workers that speed and efficiency are increased. As the modern artilleryman may not invent he takes the battery gun, mounting, ammunition and surroundings, as he finds them. He knows that the constructive and manufacturing departments will, each in their own way, do their best; but he finds that their thoughts are not his thoughts and that they do not know his wants as thoroughly as he knows them himself. Still a garrison artillery officer can occasionally do something for speed of fire. It may be no part of his actual duty to call attention to what may appear to him manifest defects in works which are being constructed for his use, under his very eyes, in his district; yet the state would always be the gainer, if he can point out errors in time for remedy, and get himself listened to, a business which requires some energy. His criticims, to be of value, should be founded on sound principles, and I hope to bring home to garrison artillery officers that the main question, which should never be absent from their minds, should be somewhat as follows:—"With what rapidity shall I be able to pour a stream of shell into a rapidly-moving ship from this battery with the proposed gun, mounting, sights, ammunition, stores, and means provided for range finding?" Their information on these points is generally very scanty, and they may have but a poor idea of what the unfinished work is intended to look like on its completion, but they may gather much information by careful inquiry and a watchful eye.

Really great speed in hitting can of course only be obtained by a large amount of actual practice and brilliant training. Looking to the cost involved in firing large guns garrison artillery can, even in the most favorable localities, never expect to get the first. They can do their best as regards the latter but their training will not approach excellence unless they lay stress on speed in working.

The system of training adopted by the Royal Artillery in the early days of the regiment ran more in the line of insuring discipline and avoiding accidents by exact, minute and rigid drill, than in aiming at the attainment of rapidity, for which their mountings and accessories were never as suitable as those of the navy, probably because the latter founded their requirements on a far greater amount of actual firing at practice. Until quite recent years garrison artillerymen, though, as now, they were men of grand physique, were below the average in intelligence; and it was probably considered by the authors of drill books that a rigid system, even though entailing slow work, was the surest method of training such material.

During the same period the English navy, though probably dealing with even less promising personnel, by an almost exactly opposite system of training achieved a success such as the world has wondered at ever since. The sailor cared little about forms of drill; speed in firing, even

at the expense of accuracy, was all in all. He sought to add accuracy by getting to the closest possible quarters. And magnificently it paid! And will pay again if the far better trained British sailor of to-day inherits the reckless pluck which led his predecessor to get near his enemy at all costs, and hammer into him the most rapid possible fire.

It is curious that two such different methods of gunnery should have been practiced at the same time among servants of the same nation, using similar weapons; and that both should have led to the top of the tree, for while Nelson and other naval chiefs placed our navy on an absolute and enduring summit, our artillery, or at any rate our garrison artillery, who were perhaps greater sticklers for minute drill than either field or horse, were also the leading artillery of the world, while its officers produced inventions which were universally adopted and remain in use to this day.

Until 1859 both services worked with inaccurate ordnance. Many guns were still in use which possessed no other means of giving elevation than quarter-sights and quoins, and laying was largely a matter of chance. It is probable that one of the reasons why garrison artillery did not adopt the naval method of rapidly pouring in a mass of unaimed fire was because, unable to advance to decisive ranges, they hoped to obtain accuracy at greater distances by deliberate work.

Until the introduction of B. L. ordnance the area of water available to the artillery of a coast fortress for the attack of ships did not much exceed 2500 yards from the coast line. Fire effect was therefore sought by multiplying guns and siting them so as to bring a cross fire to bear in every direction. As there was delay and difficulty in firing S. B. muzzle-loaders at angles of depression, and their range was so short, nearly all were placed near the water's edge. Scarcely any mechanical aids were used, and there was nothing to interfere with a very considerable rapidity of fire being attained, for the projectiles were generally of a weight well within the lifting power of one man, a very important element in rapidity of service but one which has too often been allowed to drop out of sight. Consequent on the introduction of B. L. guns not only has the accuracy of fire greatly increased, but the area of sea available for attack from fixed guns has been gradually and largely extended, and has now probably attained a practical limit of 7000 yards, for fast work up to 10,000 yards for considerably slower fire; but, concurrently with this increase of available range, the number of guns has diminished, so that each gun is called on to do far more, while the time available for the attack of ships has decreased in a higher proportion. Garrison guns fired as fast, or faster, before the introduction of steam war vessels as they do now, but sailing ships moved exceedingly slowly and once in range were apt to be kept under the fire of stationary guns by failure of wind, the action of currents, or by wreckage of their masts, etc. Now-a-days ships can get out of the limit of practical range of garrison guns, from any position in which they may be placed, in less

than fifteen minutes; unless therefore an exceedingly rapid fire is brought to bear the chance of injuring a ship during her stay in the zone of fire as she passes a fort, or forces her way through a channel, is exceedingly small. If guns, however, can insure a large number of strikes, even with comparatively small projectiles, there is always a chance of disabling a ship sufficiently to keep her longer under fire.

At the present time, then, targets which will offer themselves to coast artillery move so fast that men trained on a slow and sure system have a poor chance of damaging them. In the Chino-Japanese War this was exemplified. The plan adopted by the Japanese was that indicated as probable in my paper "Defense of a Coast Fortress," Vol. XX., R. A. I. *Proceedings*, that is to say an attack in the nature of a reconnaissance was conducted to test preparedness, with a few ships engaging generally at a long range. The ships are said to have steamed leisurely along the whole front of Port Arthur, offering the Chinese coast artillery a rare opportunity but, though they possessed suitable guns, they were quite unequal to the occasion. No doubt had rapid, accurate work obtained among the Chinese gunners, the ships would have made off out of range as fast as they could, but then the reconnaissance would have failed, a subsequent naval attack might not have been made, and during the few minutes occupied in getting away possibly one or other of the ships might have been disabled, and damage out of all proportion to what the ships could effect, would have been done; for if a ship is so injured as to have to retire out of action it is not one gun but the whole of her armament which ceases to be a factor in attack, and it may be long before her guns can be of the slightest use again.

In 1859 the first really well-considered attempt was made in England to improve the service of coast artillery by starting a school of gunnery. A small number of officers and N. C. officers were assembled at Shoeburyness for a nine month's course of instruction. The writer was one of these officers and kept careful notes of this first course; notes which abundantly prove the comparative ignorance of those days, and tend to show the vast increase in artillery knowledge which has been effected in a period of less than 40 years. During the progress of this first long course of instruction many changes were made for the better. Its great success as an institution and its future permanency were very largely due to the very happy selection of Colonel W. B. Gardner, R. A., as chief instructor. A man of superabundant energy and great determination, he possessed a practical gunner's mind far in advance of his time. He foresaw the coming necessity for rapid work and strove to attain it by reliance on individual intelligence and resource, as opposed to stiff unyielding drill. He suppressed the long-winded quotations from drill books with which instructors were wont to weary men, and compelled them to themselves demonstrate what was required to be done. He insured officers knowing thoroughly what to expect from their men, and encouraged a tendency on their part to cut out useless work by making

them go through every portion of the drill book, even to fetching their own stores and working through every operation with their own hands. Above all things he so inculcated speed of work in every department that it is very doubtful whether the records of his day, taking all things into consideration, have ever been beaten. Like many another earnest reformer he met with strong opposition and a *vis inertia* which eventually broke him down while, unfortunately for the regiment, he was allowed to retire unrewarded and his great work unrecognized except by his pupils. For some time after, however, rapid smart work with guns became the fashion, gradually to relapse into slowness, latterly made more pronounced by abuse of the instruments, in themselves good servants but bad masters; and by a discouragement of individual resource, inventive ability, and scientific attainments.

It is, then, very doubtful whether speed in firing by garrison artillery at the present time eclipses or even equals the records of earlier long courses. Men are better than ever they were, guns are more accurate, and could, as will presently be shown, be fired at considerable speed; the batteries, mountings, etc., are far more ingenious and costly. Why should there be room to doubt whether old records are broken? Can it be that the improvements in surroundings are not altogether such as really increase the warlike powers of garrison artillery? As regards long range work, there is no comparison, for the old guns had but short ranges; but suppose the conditions of the contrast laid down equal numbers of men manning as many guns as possible; and results were judged by the number of foot-tons of energy expended by each on a ship of their period, starting from a point near the battery. The old target ship moved slowly, the modern ship very fast. The system now in vogue compels the withdrawal of an ever-increasing number of artilleryman from the actual service of guns in battery, as P. F., D. R. F., telephone men, and what not, so that an equal number of men man far fewer guns than of old. The guns are heavier, and give an enormously greater striking energy when their shot does strike, but their service, owing to their mountings, complicated emplacements, and numerous adjuncts giving accuracy at the expense of speed, is very slow, while it is most difficult to induce men trained to wait on instruments to act promptly on an emergency.

A gun which only fires, say once in four minutes, though it may possess great striking energy, needs every bit as much ranging as a gun firing one shot per minute before it can be made at all certain of bringing that energy into useful service. Starting with each gun loaded, and allowing four shots to be necessary for ranging (not by any means an excessive number with ordinary cartridges), before hits begin to be obtained with certainty, the powerful gun takes sixteen minutes before it can commence to use its energy by striking, while the lighter but quicker gun, will, by that time, have poured in twelve effective shots. Presumably the total foot-tons of energy expended on the target ship by the

lighter gun would largely exceed that of the heavier gun, and there is a far greater chance of some vital part of the ship being reached, or of guns and men being put out of action, even if more or less accidentally, by the projectiles of the lighter gun.

From some time narratives of actual practice from 9·2″ and 6″ B.L. guns at moving targets, worked by men well up in their drill, though with limited experience of practice, and striking an average of the speed in firing attained at this ordinary practice, which includes all delays in service, whether occasioned by slow mountings, indifferent means of obtaining ranges, poor communication, and casual stoppages from defective gear or wrong usage, but omitting delays due to peace conditions, such as foul range, the relative time-average per round bears about the the following proportion :—

6″ B.L. High Site, Vavasseur	2
6″ B.L. Moderate Site, Barbette	3
9.2″ B.L. " "	5

The figures represent a little more than minutes. There is no reason to suppose that on actual service the guns would be fired quicker, at any rate until they had been a considerable time in action, but no doubt had the practice been competitive it would have reached for a limited time a much higher average. I have, unfortunately, to compare the results with competitive practice.

The Admiral commanding the Mediterranean fleet has kindly given me averages of prize firing of ships armed with similar guns, as follows ;—

6″ B.L. . . .	6.8 Rounds in 6 minutes.
9.2″ B.L. . . .	10 " 12 "

Now, here is a speed for garrison artillery to work up to, and, as it is to be hoped that R.A. competitive practice will soon be carried out from 6″ B.L. guns, we may be able to abtain a fairer direct comparison with practice from naval mountings and emplacements, and mountings designed for the use of garrison artillery.

But a short time ago a fleet was at anchor close under the guns of Gibraltar. It was known to be about to start, and 9.2″ and 6″ B.L. guns were manned. Their rates of firing were assumed to be the ordinary average of each individual gun, and, also based on practice experience, it was assumed that four rounds at least would be wasted in ranging, getting rid of the error of the day, powder and corrections, before the guns commenced to hit with certainty ; but that after that every shell hit. This, of course, is not quite true ; some shells would, in practice, hit in ranging, but on the other hand some would miss afterwards. The fleet departed in regular order, and steamed round the south of the Rock at close range, certainly not at any time at more than fifteen knots speed, but the ships were all out of effective range in twenty-two minutes.

Some guns, with a large arc of fire, were bearing on one or other of the ships all the time; others, which commenced firing as soon as their arcs were entered, had only a limited portion of the twenty-two minutes to fire in, and had not sufficient time to get off their ranging rounds. It is unnecessary to go into details, but the result proved the absolute necessity for increased speed in firing garrison guns, if they are to do any good at all; the great gain in efficiency each gun that could fire quicker than another possessed; the enormous advantage of choosing good sites with a large arc of fire; and the benefit which would accrue by the use of ammunition which would admit of ranging being completed in two rounds. Again, during the Gibraltar manœuvres of 1896, torpedo boat night attacks were a great feature. It was abundantly evident that the chance Q.F. guns would get, would seldom exceed three or four minutes, and would frequently be much less. Men trained to slow fire and distant control would do no good under such conditions.

No branch of the artillery have to deal with such quick targets as coast artillery. Why then should they have the slowest firing arrangements? The fastest target on which field artillery are likely to practice is cavalry in motion, say 10 to 12 miles an hour, but a ship moving at 18 knots or a destroyer at 25, are targets racing at 20 and 28 English miles, and these will have to be operated upon. The pressing necessity for guns, ammunition service, mountings, sights, emplacements and range indicators, which will enable garrison gunners to very materially reduce the time now occupied over each round is clearly exhibited when, by chance, a fast target is available.

A really suitable gun should always be ready for the layer. The time that a good layer necessarily spends in obtaining accuracy when a gun is well placed and found is very small, and whatever time is well spent in insuring accuracy is not thrown away, but every second in excess of this necessary time that is occupied in loading, traversing, elevating, predicting and unnecessary ranging, is wasted and causes an enormous loss of power and effect.

Among the principal causes of slow fire are the following:—

(1) Unsuitably designed emplacements and mountings.

(2) Unsuitable sights, deflection leaves, and means of giving quadrant elevation.

(3) Dissimilar cartridges and slow supply of ammunition.

(4) Poor loading, traversing or elevating arrangements.

(5) Bad or defective communications in respect of command or range-indicating arrangements.

(6) Want of rapid targets at practice during peace.

(7) Unsuitably trained or unpracticed men.

(8) Want of knowledge of the capabilities of ships.

(9) And as regards a large portion of the year, one due to nature,

namely, darkness, and a want of means of lighting up the area of water covered by the guns, and consequent neglect of night work.

All the above are, in most cases, capable of improvement and even in the case of old armaments much might be done under 2, 3, 5, 6, 7, 8 and 9.

(1) Imbued with the old and slow methods of artillery fire, the designs of land emplacements and mountings do not, for the most part, seem to have taken into consideration speed in firing at all, or at any rate, do nothing like the extent of the mountings provided for the navy. Considerations of safety have been given infinitely more prominence than those of speed, and in some cases, pure gunner requirements have yielded to building conveniences. Now it may be taken almost as an axiom that security demands a sacrifice of speed much in proportion to the amount of protection given, though, as I have endeavored to prove, extreme rapidity of fire is absolutely necessary now-a-days to insure efficiency.

Thus, for instance, absolute safety could be insured to a gun and its detachment by placing them in a deep cave at an entire sacrifice of hitting power; or on the other hand, a gun could be mounted on a bed plate in the open, somewhat as seen on the experimental ground at Shoeburyness, neither gun or detachment having any protection, except, perhaps, a small gun-shield. Here, the gunners are on a level with their work, and a maximum of speed, efficiency, and all-round fire is obtainable. There must be some satisfactory means between the two extremes.

Briefly described the usual course now pursued runs in the line of making a very expensive and highly-finished emplacement, grateful to the eye of the engineer if not to the artilleryman; the emplacement usually taking the form of a more or less circular pit, of great depth and often of large diameter. A gun mounted in this pit would be safe from all but high angle fire, but would itself be incapable of firing except at great elevation. Therefore the necessary command over the edge of the pit is procured by partially filling it up with a drum, and causing a moderately large slide and carriage to traverse on its upper surface; or, what has been perhaps more common, making an enormous slide and carriage to traverse on racers laid at the bottom of the pit. In either case a gun can by no possibility fire rapidly, nor is protection given to more than a portion of the detachment, for the men have to climb up and down to their work and raise the shell, etc., to an unnecessary height. In some of these mountings the detachments are as exposed as if the gun itself was in the open on a mounting calculated simply for speed of fire, while the climbing up and down is a serious addition to the labor of the men. The exposure of detachments in working is quite recognized for frequently, in addition to the pit, a shield is added. A slightly larger shield on a low mounting would probably give all necessary protection if there were no pit at all, and the gun could then be worked at high speed, without wearing out the detachment by unnecessary physical exercise.

Another form is the pit with the disappearing gun, which is apt to get

out of order, is expensive, and needs much care and training. It is, necessarily, a slow firer, but it is very secure from casual fire. When a gun must be badly placed owing to no high ground being available reasonably near the water's edge, such protection may be desirable, but the guns must be recognized as slow firers, and should be multiplied for effect.

(2) Wherever high ground is available, with only a moderate loss of range, garrison guns should be sited high. Guns on an elevation, even though slightly retired, can be made to be more certain and quicker hitters than is possible to those on a low site. They need little or no protection from ship fire; and up to considerable ranges, proportional to their height, can dispense with the slow processes of P.F and D.R.F. work by means of comparatively simple automatic sights. Such guns can be made to predict for themselves sufficiently well to indicate the course and speed of a ship. By an "automatic" sight, is meant a sight, telescopic or otherwise, which, without calculation or assistance from the layer, sets itself in such a fashion, that after once having a part of the sight raised or lowered to correct for the error of the day, as found by ranging shots, for tide, and to bring the point of impact to the required height above the water-line of the ship, it is only necessary as far as elevation is concerned to lay on the water-line of the target vessel to strike it; and this without reference to the range in yards or elevation in degrees, or any calculation except for deflection, and the correction for this may be made approximately automatic also. There is no great difficulty in obtaining such a sight if the foresight is made the regulating movable sight, corrections being put on the hind. As regards deflection, if the gun is fitted to predict while the sights follow the ship, the course and speed of the vessel can always be obtained, while the deflection leaf if made to pivot can be worked without calculation by placing its bar roughly parallel to the course and placing the speed on it.

Low-sited guns always present difficulties as far as our present knowledge extends, they may be made quick firers but can never be quick hitters except at very close ranges; trust in flat trajectories is delusive and has led to many a badly-chosen gun-site. Low-sited guns are probably best worked by some of the existing slow methods; range by P.F. or D.R.F., line over sights, and quadrant elevation; but still there are several points in the best found guns on low sites which are capable of improvement with a view to greater speed in hitting. In all mountings, whether guns are well or badly sited, the layer should be enabled to see easily over his sights at the time of firing, and he should himself fire without having to take his eye off the sights. The means of knowing what quadrant elevation to give and of giving it quickly require alteration, while at present deflection is given almost by guess-work or by calculation, causing long and unnecessary pauses for a sort of prediction by the G.G.O. or by the P.F. operator. The former should be kept fully informed of the course and speed of the vessel, There ought in fact to be no uncertainty or guess-work in the matter so long as the vessel's course

approaches an even line. Speed deflection leaves are much wanted. Though the sights used by the navy are unsuited to more accurate garrison artillery requirements, yet what is good in them could be adapted to shore wants.

The discouragement of science and invention among garrison artillery officers of late years has been a misfortune to the country. A "Shrapnel" or a "Boxer" would have no place now. It has tended to prevent simple adaptations of gear to fighting requirements. Manufacturers, unchecked by actual practical experience, produce most ingenious but complicated appliances that are often not really wanted, though their very cleverness frequently charms the garrison gunner into receiving them with open arms. He should refer all novelties sprung upon him to the practical tests of speed in working and accuracy, and bear in mind that the cleverest inventions are the most simple.

(3) There are many more difficulties than meet the eye in insuring that during the continuance of firing no change shall occur in the strength or weight of the powder contained in the cartridges used. Cordite may be left out of the question at present. Yet the fact that every precaution taken to insure accuracy and speed in firing, such as well sited and suitable emplacements, good guns and mounting, perfect sights, expensive and accurate range-giving machines, and well-trained men, are rendered almost valueless if cartridges of varying ballistic properties are used, should point to the urgent need of greater attention being directed to this subject. Organization of ammunition supply is not perfect until every magazine from which a gun or group of guns is supplied contains but one ammunition group of cartridges; and an ammunition group, to be of any value as such, must be formed of cartridges of closely similar ballistic properties. Cutting the Gordian knot by merely grouping cartridges to suit dates of filling is of no practical value whatever. Such cartridges are found to occasionally vary the point of impact of successive rounds by hundreds of yards. It is of course most desirable to use up older cartridges at practice, and when these are broken up, carefully re-mixed and refilled for the purpose, they frequently shoot remarkably well. As to this there is no difficulty if sufficient latitude is given locally and a drying and filling room exists, as it should in every fortress; for odd lots can then be assembled, broken up, re-mixed and re-made for practice without reference to headquarters. The present system of merely using what is believed to be the oldest powder results, not only in bad shooting, but a continuous increase in the number of ammunition groups, and in each cartridge store containing cartridges of varying ballistic qualities, with an ever-augumenting difficulty in attaining speed in hitting. Though this might be looked on more as a question of pure accuracy of work, yet there is not a gunner who has had to direct fire that does not know the loss of time that ensues when his best calculations are hopelessly upset by a series of abnormal rounds. In some cases, in spite of careful sorting, ammunition groups are such

that the guns they serve could probably not be ranged satisfactorily at all; while if the powder were really sorted out into homogeneous ammunition groups, these would be so numerous that the guns would require ranging many times during an action, entailing a great waste of speed and efficiency of fire. To avoid this serious loss a number of small ammunition groups (over and above the amount required for practice), sufficient to completely fill the magazines of a group of guns, should from time to time be broken up, mixed, and re-made locally.

As a rule cartridges made entirely of the same original lot appear to shoot very much alike, irrespective of their dates of filling or of the magazines in which they have been kept; and as far as can be judged, without a more systematic test than mere observation of practice, there is no drawback to placing such cartridges in one ammunition group,

As regards slow supply of ammunition:—With guns in high-sited batteries it is generally a mistake to keep the shell underground, and even in lower-sited positions it is only occasionally necessary. It is with the shell supply that, owing to their weight, delay generally occurs. A comparatively light cover is all they need if they are packed so as not to touch each other; and much economy would be gained by storing them on the level of the gun or, when convenient, slightly above it.

(4) All loading, traversing and elevating arrangements are simplified by low mountings, such as are met with in naval use. Mountings which require a gun to be traversed round to a fixed loading place are slow and should be avoided whenever possible. To get really quick work the layer must be able to, at any rate roughly, follow the ship during the process of loading and be ready to fire directly it is completed. Loading and laying should, in fact, be simultaneous acts. This principle is admitted by the introduction of Q.F. guns, and it is trying to the garrison gunner to see new emplacements constructed from which truly effective fire can never be obtained from a non-recognition of the importance of this aid to speed in firing but, leaving modern constructions alone, there is no reason that somewhat older types should not be rendered far more easily worked with rapidity than they now are and, by comparatively cheap alterations, be rendered doubly effective. The shorter the time the ammunition is in the gun after the first round of a series the more even is the shooting of the cartridge.

Traversing gear requires to be just sufficiently quick to enable the gun to easily follow the bow of a rapid vessel, moving across the gun at the closest likely range. Too rapid traversing gear is apt to make a heavy gun, on a heavy mounting, overrun and to convert it into a slow shooter. A traversing and elevating gear which can be at any rate partially controlled by the layer is a desideratum. Above all things everything must work evenly, without jerks; jerks are the bane of the layer and detract from speed.

(5) Bad or defective communications lead to uncertainty, disappointment, and slow work. The fewer communications there are, as a rule,

the less the delay, while the most successful guns are those which require the fewest communications. A gun on high ground, with an automatic sight, finding its own range, needs exceedingly few accessories. The C.O. should be able to check its fire at his will; to cause it to support other guns, or to aid it with warning and advice, but the fewer the messages sent the more rapidly is effective fire obtained. It follows that the communication should be the best obtainable, for indifferent methods of transmission tend to multiplication of messages, irritation and confusion. As a general rule after general permission to engage is given, no further message should be necessary until the progress of the action induces a weighty reason for switching fire. Slow fire at practice has often been largely due to the adoption of telephones which, as a sole method of communicating, have proved slow and uncertain for garrison artillery purposes. A recording telegraph capable of standing the shock of gun fire would save scores of messages and much delay. But telephones are installed so generally that they cannot be ignored; what is required to supplement them is a loud continuously-vibrating electric bell close to each gun, which once set agoing by the F.C., or B.C., shall continue to sound until switched oft by the G.G.C., or G. C., who would at once stop firing and report. This would afford instant control and dissipate much anxiety, while the slower telephone would be looked to for explanation and instructions. Such a bell could be made capable of conveying more messages than one, with great rapidity.

Badly-sited guns and the more antiquated emplacements require, in most cases, more communications. Each must be taken on its merits, it is impossible to satisfactorily lay down an absolute rule for all; a very little of the most rapid possible firing best shows what is wanted, time being taken from the C.O.'s station issuing an order to engage; with one or two attempts at stopping and switching fire. Such practice is often a revelation to those who believe in existing means of fire control.

(6) It is almost impossible for garrison artillery to become highly effective shooters at fast vessels without much practice, yet it is unlikely that a larger supply of practice ammunition will be granted. But the little they get could be, and would be, turned to much greater advantage if they had fast targets to shoot at. The drill book may teach them the right lines on which to work, just as the Badminton Library tells a novice how to hold a gun, and where to aim, to hit a rocketing pheasant, but the pheasant is probably safe from a man whose only experience of shooting is book lore. However few rounds are available coast artillery must have targets which can move at a pace approximating that of war vessels. If artillery are supplied with reasonably fast steam vessels, under their own control, very fast targets would soon be forthcoming at the cost of a very few rounds, while the value of what was left would be vastly increased. It is next to impossible to make officers and men realize the necessity of extreme speed of fire when a target remains for hours in range, when they know that the tug supplied cannot, even without a

target, slip away in a hurry out of the gun arc; and when it cannot move reasonably quickly out of foul range into fair open water. Very fast targets would almost by themselves teach rapidity of fire and give the necessary amount of coolness and nerve. Every effort should be made to obtain them. Too often any sort of tug, obtained at a cheap rate because useless for any other work, is thought good enough for towing an artillery target.

Even at the present day many a round is fired at a motionless barrel, in waters free from shipping, three or four minutes or more elapsing between each round. This is almost wasting the value of the ammunition. When Q.F. guns are mounted the very fastest targets are needed to enable any useful training to be given and to eliminate false conceptions of fire control.

(7) The training of officers and men closely follows the means given them for work. Our officers and men are excellent but get comparatively litle actual practice in shooting. Some of the slowness of their fire is due to over-control in details, a want of confidence in individual intelligence; to anxiety to make the most of each of the few rounds given them; and possibly to too constant criticism of practice. The life of a modern gun is but short; its ammunition is expensive and it is useless to hope for a grant of sufficient heavy ammunition to insure brilliant rapid shooting from large guns, but very good shooting may be possible nevertheless. To train layers to lay quickly, group officers and B.C.'s to act decisively and to avoid uselessly long predictions, it may be necessary to take extensively to 1″ tube shooting and to trust more than ever to drill rounds and existing annual allowance of ammunition for proficiency in loading, always working against time as soon as men pass from the elementary stage. Individual intelligence and self-reliance must be more cultivated and intelligent fire superintendence must supersede rigid fire control, at any rate among well-trained garrison artillery. Fire commanders should so teach their subordinates that they can trust to open fire directly the occasion arises; there is no time now, with fast targets, for bandying words on a telephone; their rôle must be to assist, without obstructing, while retaining the power of instantly stopping fire if inefficient, or of rapidly switching it elsewhere if needed. The latter will always entail a loss of time and should be sparingly practised. It will probably be but seldom required in warfare, but now and then an occasion will arise where the possession of such a power might have an important bearing on an engagement.

It is a great mistake to suppose that rapid work leads to inaccurate, or that slow work insures, good shooting. In most cases good shooting and rapid firing go hand in hand in competitive practice and training, for the two should go together. Perhaps the surest way of quietly bringing home instances of avoidable delays to those concerned is to have a time narrative kept at practice by an independent observer, with a watch before him.

There is often no time for many details to be entered, but in that case practice can usually be commended.

(8) Garrison gunners should receive every encouragement to make themselves acquainted with the use of boats and launches, and to get accustomed to sea work and the management of targets. At many stations they have few facilities for this, and then targets are not run well. There are few more melancholy sights than a sea-sick helpless range party, while their records under such conditions are not trustworthy or full enough to be of much use. Officers should take such opportunities as may offer of seeing practice from our war-ships, and the way in which ships are likely to manœuvre in attacking and firing. Many hints as to quick shooting may be picked up. Naval officers will often take an artillery officer out to see quarterly practice on a wish being expressed; also in torpedo boats, which certainly teach the necessity of avoiding delay when using the smaller quick firers.

(9) Means are almost universally wanting for practising laying at night. Artillery will fail in night work, and especially with Q. F. guns intended to ward off torpedo boat attacks, if deprived of the means of lighting up the water area over which they fire. Each group of Q. F.'s needs a fighting light, or an enemy's torpedo boats will slip in with ease. It would probably be wise to hand over all lights which bear on water areas to the artillery; but even if search-lights and fixed beams are not so treated, gun fighting lights must be under the complete control of the garrison gunners who are responsible for keeping the water areas covered by these guns free from intrusion.

In conclusion there may be some who might urge that firing at great speed may be all very easy at some places, but that it cannot be practised in localities where foul ranges are the rule and fair open water the exception. Such a plea for slowness should not be entertained for a moment. It is when practising over very foul ranges that the necessity for rapid smart work is made most manifest. Companies detailed to practice in such places are entitled to much sympathy, but it is frequently from want of decision and organization that their troubles arise. They are often kept for hours, more or less constantly at the guns, officers and men naturally getting slacker and slacker as time wears on without a round being fired, but nevertheless chance after chance of pouring in a few rounds is obviously permitted to escape; sometimes from doubt (not always illfounded) in the mind of the O. C. of his ability to instantly stop fire should danger arise; more frequently from slowness in some form or other, either on his part or that of some of those under him; or, what is perhaps a still more common cause of delay, want of practical experience, decision, and power of grasping the situation on the part of the danger officer. The latter holds a most responsible post and needs as much training and practice for his work as anybody, for it is astonishing how many opportunities for firing with perfect safety a really smart and capable danger officer can offer to a

battery of guns if he feels a confidence that those manning the guns will only respond instantly. Being a mere peace-practice official few hints are laid down for his guidance, but it repays a C. O. well to afford him every assistance in the shape of trustworthy lookouts. When a good danger officer forecasts that a safe space for fire is iikely to occur he lets the C. O. know that he will probably be able to raise his flag soon, and the latter should at once get all ready by causing range-finding operations to re-commence and, as the opportunity seems about to prove a good one, by assembling the men on the guns, so that almost at the instant that the flag goes up firing may commence. If fire is not always opened smartly a danger officer is apt to think it is not worth while to take advantage of brief openings and fails to raise his flag.

Keeping men more or less at attention at the guns, for considerable periods, when it is manifest that the range is foul is a fruitful source of slow firing and slackness. It is far better to dismiss them until they are wanted and rely on their being smart in answering to a call, encouraging them to enter into such little amusements as can be organized close to the guns. Unavoidable pauses during practice often afford an excellent opportunity for assembling detachments and criticising their performances up to that point, or for imparting theoretical knowledge and classifying gunners. Each company will pursue its own method, but the smartest will be the company which has managed to pitch most shell into the target in the shortest time available for actual practice.

THE GRÆCO-TURKISH WAR.*

(From the Army and Navy Gazette, London.)

BY the middle of April it was seen that the invasion of Turkey by irregular Greek bands, and the difficult position in which Edhem Pasha was placed, had made war inevitable. The *Times* correspondent at Athens says it is certain that on April 10, the day following the invasion of Macedonia by the forces of the Ethnike Hetairia and the conflict between the Greek and Turkish outposts at Prophetes Elias, Edhem Pasha received orders to advance on Larissa. These orders were cancelled three hours later. On April 15 the Greek Minister in Constantinople, Prince Mavrocordato, having satisfied himself that the Porte was preparing the order for an advance from Macedonia without previous declaration of war, sent a warning to the Greek government and suggested the advisability of informing the Commander-in-chief of the Greek army in Thessaly that an invasion was imminent.

On Saturday evening a circular was addressed to the Ottoman representatives abroad, dealing in detail with events, pointing to the Greek incursion near Krania, and declaring that Greek troops took part in the

* The map accompanying this article is from the *Rivista di Artiglieria e Genio.*

fresh incursion. The circular expressed a hope that the Powers, in a spirit of justice, would agree that the entire responsibility for war rested with Greece. It declares, in conclusion, that Turkey has no idea of conquest, and that, as a fresh proof of her pacific sentiments, she is ready to withdraw her troops if Greece withdraws hers from the frontier and from Crete.

Prince Mavrocordato received his passports about 11 o'clock the same night and left on Tuesday, on which day also Assim Bey, the Turkish Minister, and the staff of the Legation at Athens left by an Austrian Lloyd steamer for Constantinople.

The Greek government, which has all along sought to throw the onus of opening hostilities upon Turkey, protested against the Ottoman note, charging upon the Turks the breach at the Prophetes Elias, and declaring that on Saturday last the Turkish army, without any provocation on the part of the Greek troops, marched forward to take possession of the frontier post of Analipsis, which by mutual agreement had been considered neutral. It was only owing to the resistance which it encountered there that this attempt at violating neutral territory failed. Neither could the Royal government, said M. Skouze's note, pass over in silence the fact that before it was officially informed by the Imperial Legation of the rupture of diplomatic relations between the two counteies, and while the King's Minister in Constantinople only received notification at an advanced hour of the night, the forts of Prevesa opened fire at 5 o'clock on Saturday morning upon the Hellenic position at Aktium and sunk the *Macedonia*, of the Panhellenic Company, as she was leaving the Gulf of Ambracia.

THE CAPTURE OF THE MALUNA PASS.

The main interest of the frontier operations has lain in the capture by the Turks of the Maluna Pass, the fighting—for which we depend on Greek authorities—at Raveni a few miles away, and the operations at Prevesa and Arta on the west and at Platamona on the east. Although the Greeks seem to have expected the Turks to advance by the Xerias Valley, Edhem Pasha resolved to seize the Maluna Pass, through which the road passes from the headquarters at Elassona to Larissa.

FOOT OF THE MALUNA PASS, April 18, 10 A. M.

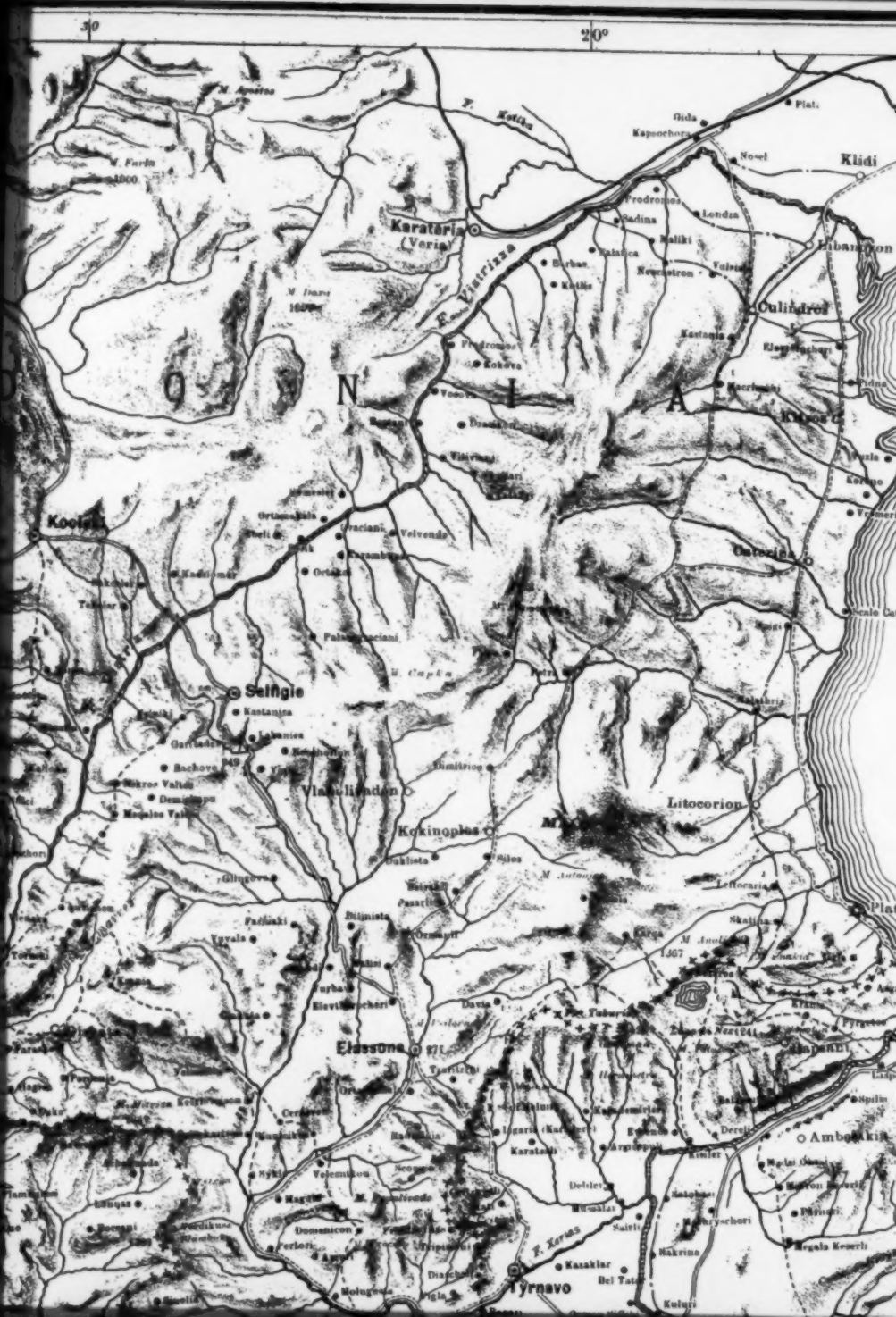
A fierce battle was fought all through Saturday night in the pass. The Greeks entered and descended towards the valley, being met by four battalions of Turks, who drove them back, and at the point of the bayonet rescued the force garrisoning the Turkish blockhouse, which was surrounded by the Greek force. On the same night Neshad Pasha, commanding the 5th Division, occupied Mount Parna in great force, and Hairi Pasha, who commands the 6th Division, prepared to enter the pass of Tehaissar, while the Maluna Pass was occupied by Haidar Pasha, commanding the 4th Division. Before dawn on Sunday Edhem Pasha rode out to direct the operations and a general engagement ensued.

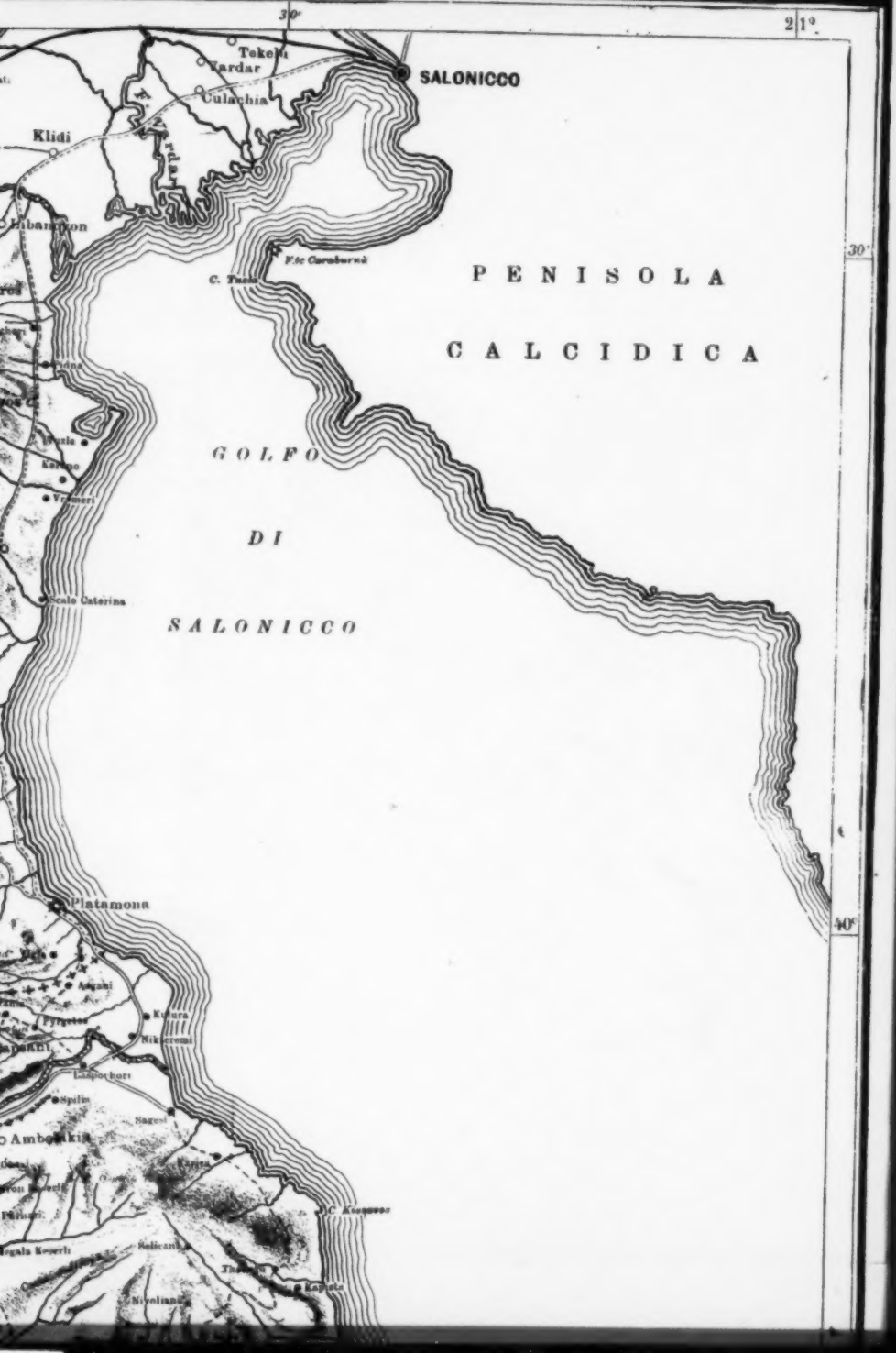
Kastoria
Krupište
Vistritza
M
A
C
R
Lake of Kastoria
Florina
Vrondou
Kozani
Katerini
Grevena
Kalambaka
Trikkala
Larissa
Elassona
Servia
Naoussa
Edessa
Vodena
Verria
Katerini
Kozani
Grevena
Kalambaka
Trikkala
Larissa
Elassona
Servia
Naoussa
Edessa
Vodena
Verria
Florina
Vrondou

Kailar
Karatória
(Veria)
C
P
D
O
N
Kozani
Siatista
Selingie
Vlasolilendon
Grevena
Elassona

Kailar
Karateria
(Veria)
C E D O N
Kootsa
Selfigie
Grevena
Elassona

20°
30°
Tekeli
Yardar
SALONIC
Culachia
Fl. Yardar
Fiat.
Glida
Kaposchora
Nosel
Klidi
Prodromos
Londza
Sadina
Kalliki
Libanatron
Vistrizza
Birbas
Kalafca
Neocastron
Fulsina
Culindros
Kastania
Klopotschori
Prodromos
Kokova
Macrinovo
Pidna
Kitros
Drasnik
Vitrinovo
Gunia
Kokino
Vermeri
Velvendo
Galatista
Scalo Caterina
GOLFO
DI
SALONICCO
Litocorion
Kokinoplos
Platamona
Skatina
Korja
Davia
Ambelokia
Derelis
Karatasli
Delilesi
Kasaklar
Bei Tatar
Makrina
Suirli
Pyrnavo
Nivolani
Kapista


Karaferia (Veria)
Selfigie
Elassona
Tyrnavo
Litocorion
Kokinoplos
Oulindron
Katerina
Klidi
Amboukia


30°
21°
SALONICCO
Tekeli
Vardar
Culachia
Klidi
Libanovon
Pta Carabournà
c. Paliuri
PENISOLA
CALCIDICA
GOLFO
DI
SALONICCO
Vrasna
Kalamo
Vromeri
Scala Caterina
Platamona
Aquasi
Pyrgetos
Kitoura
Nikiteromi
Lapsochori
Spilio
Nagesi
Ambelakia
Kavasi
C. Kissavos
Selicani
Thalassi
Kapsole
Nivolianni
30°
40°

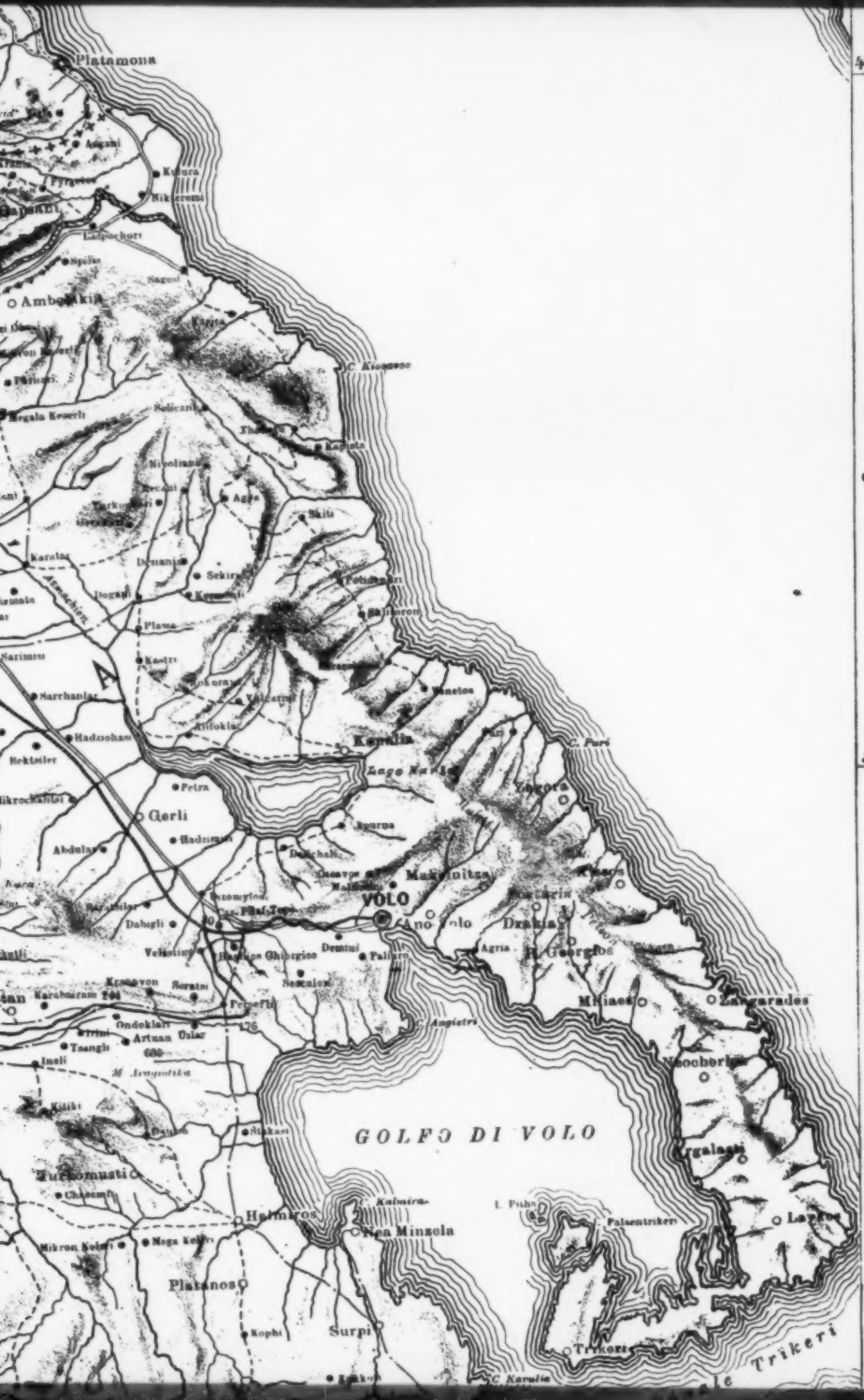
40°
30'
JANINA
Konitsa
Pramanda
Vergarelion
Velentsikon
Zagoria
Zagoria
ARTA
Skalitsaria
Katavolon
Kanalia
Vigla
Kanalopoulo
Jonicari
Pachikelamon
Nenohori
Rami
Cheramate
Costachion
Flisia
Curicolu
Limeni
Osmopoli
Peta'
Flisii
Kanalia
Kanalopoulo
Kanalia
Kanalopoulo

Elassona
Kalabaka
Tricala
Trikala
Kerdilia
Palamas
Sophrades
Karoplani
Orawiana
Musaki
Pharsala

Grevena
Kozani
Kalabaka
Tricala
Trikala
Tirnavo
Larissa
Karditza
Velvendon
Servia
Elassona
Kastoria
Siatista
Ptolemais
Kozani
Veria
Edessa
Naoussa
Katerini
Litochoron
Olympos
Velentsikon
Skotina
Kazopolani
Pharsala
Farsala
Domokos
Lamia
Thermopylae
Thessaliotis
Pharsalia
Thessalia
Thessaly
Epirus
Macedonia
Pindus
Olympus
Peneios
Aliakmon
Haliacmon
Vistritza
Salambria (Peneus)
Titarisios
Sperchios
Gulf of Volo
Gulf of Salonica
Gulf of Lepanto
Gulf of Patras
Gulf of Corinth
Gulf of Arta
Gulf of Volo

Kokinoplos
Platamona
Elassona
Ambelakia
Tyrnavo
LARISSA
Farsagha
Domokos
Sophades
Palaimas
Tsaritsani
Nebogler
Maimuli
Gerli
Turkomnati
Duvlatan
Sugunari
Dranista
Platamona

Elassona
Tyrnavo
LARISSA
Ambelakia
Malmuli
Nebogler
Tsarmadli
Palamas
Karditsa
Sophades
Farsagna
Domokos
Argenisa
Karopisi
Duvistan
Tsigunari
Kanavari
Pinios R.
Titarisios R.
Enipeus R.

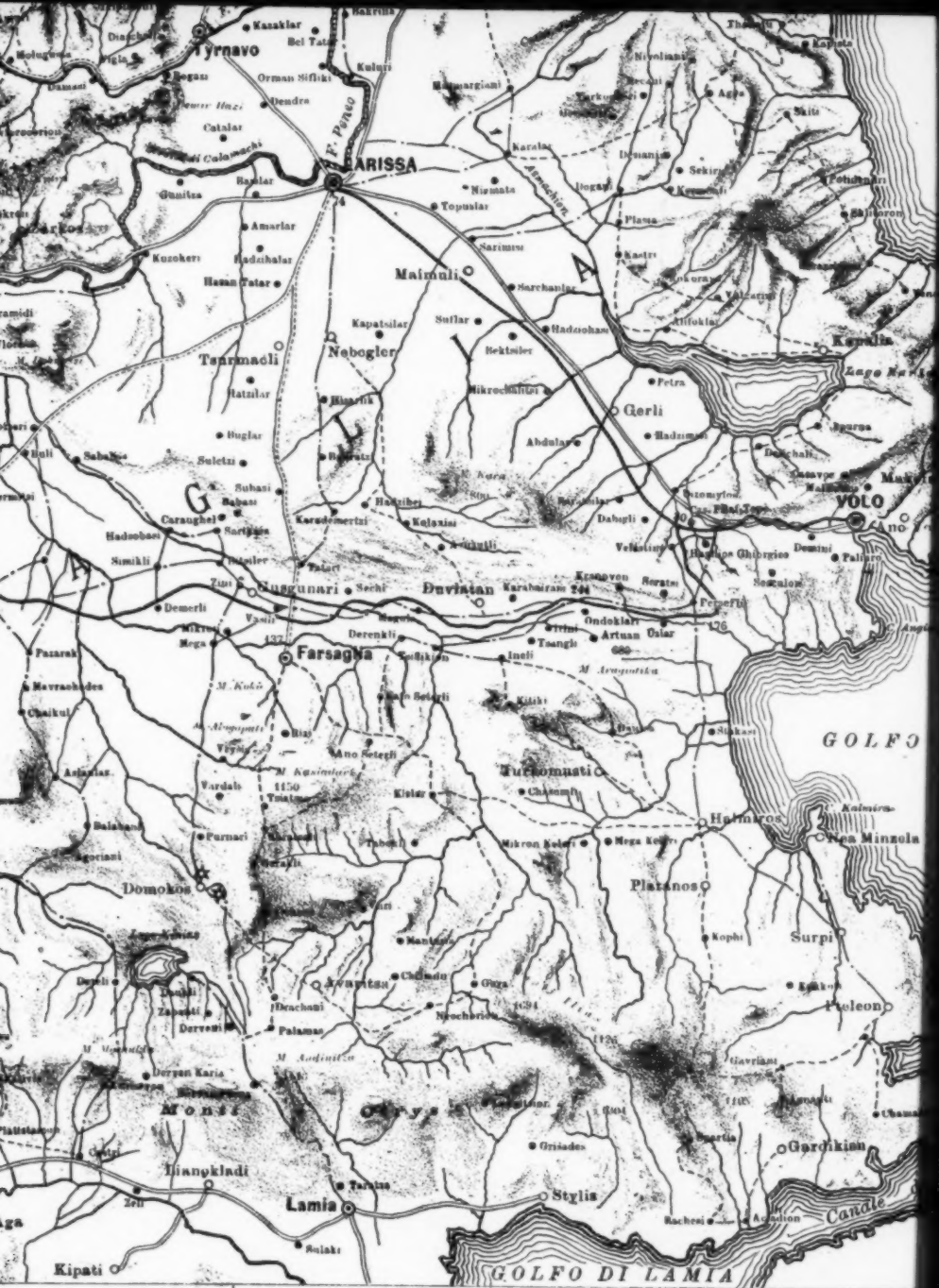

Platamona
Ambelakia
Gerli
VOLO
Ano Volo
Makrinitza
Portaria
Zagorades
Milies
GOLFO DI VOLO
Nea Minzela
Halmiros
Platanos
Surpi
Trikeri
Le Trikeri
Lafria
Palaemitkeri
Argalasti
40°
30'

JANINA
Lago di Janina
Demati
Chasiki
Leunina
Kotras
Kalarita
Paramithia
Agiassila
Kukuliota
Vergarelion
Vrestena
Velentsikon
Skulfiarra
Sfakiotikon
ARTA
Plisti
Cheramates
Costachion
Flinka
Zavaka
Curicolu
Jenicari
Salagora
Vigla
Kanali
Kanalopulo
Bichlilar
Prevesa
Vonitza
GOLFO DI ARTA
Arcuda
Rodavassaras
Lutros
Kanca
Imaret
Pera
Tzumerka
Dolista
39°
30'
19°

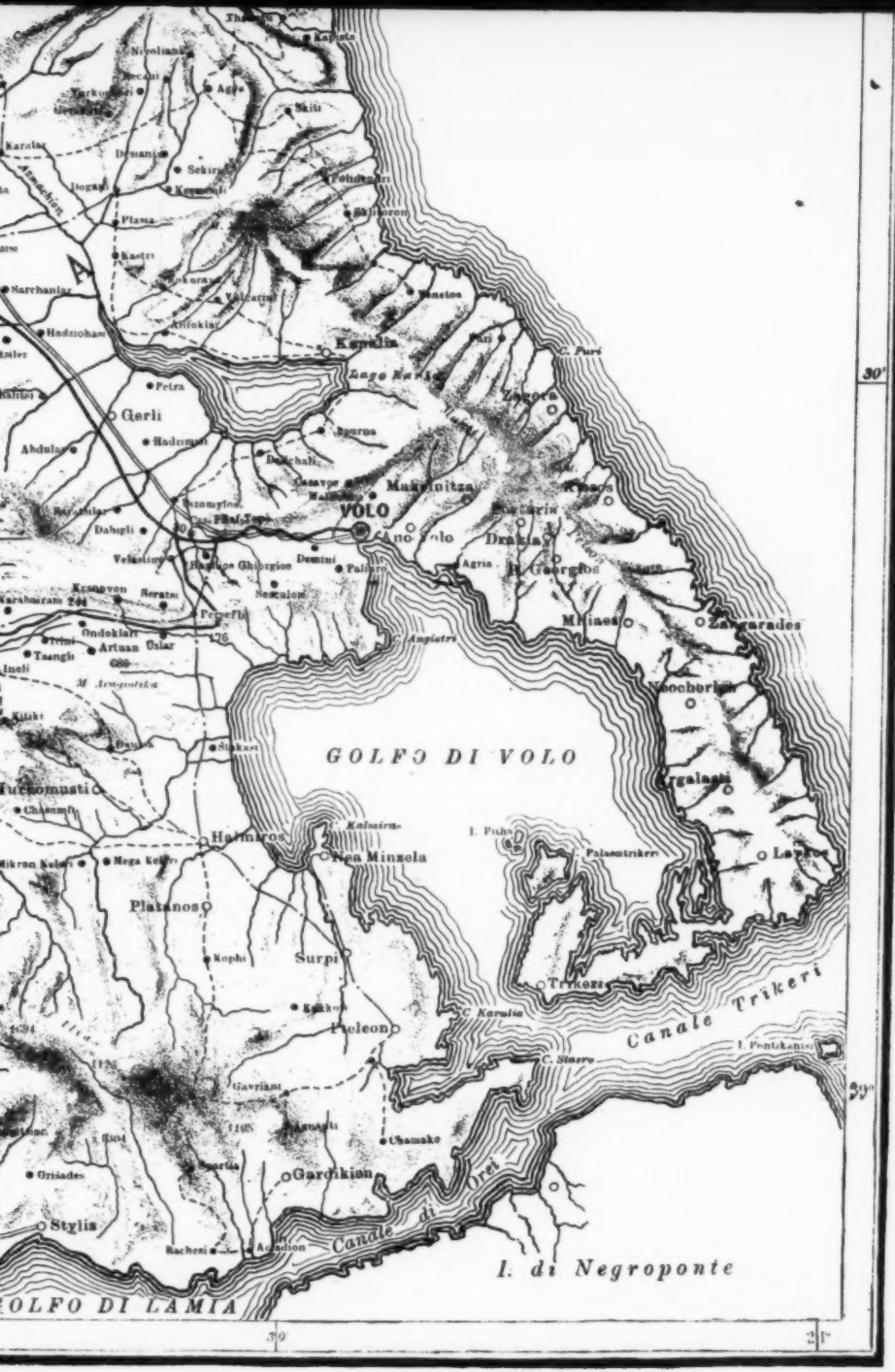
XUM

Kalabaka
Tricala
Tirnavo
Trikkeon
Varkopi
Rapsista
Beltini
Pusto Pasari
Husaki
Phanari
Karditza
Palamas
Sopiades
Kumhutsana
Kumbhutsana
Sekhitsa
Kaliphoni
Kuvarsikion
Zalongonadeo
Palouri
Lukeo
Chalambreoi
Karopisi
Granista
Phurka
Hepsina
Gumitsa
Varibopi
Aga
Kipa
Kerasona
Mavrikion
Kalyvasion
Kurtiki
Vlochos
Kuvelei
Koprana
Preventsa
Vanakulia
Barakiko
Vervena
Kurbali
Georganades
Vanari
Velesi
Mandani
Parapratani
Kostika
Keramidi
Vlochos
Kolkari
Kermitsi
Kapudzi
Delivesi
Zaimi
Passarah
Havraohadra
Chaikuli
Zagliopi
Apidia
Teamon
Vrangiana
Petsiko
Chorion
Tsapiomatiko
Valsero
Sirista
Kiliomeno
Paperuna
Korisa
Mavrikion
Kalyvasion
Aga
Varibopi
Hepsina
Granista
Karopisi
Kumbhutsana
Kerasona
Tricala
Karditza
Sopiades
Palamas
Phanari
Husaki
Pusto Pasari
Trikkeon
Tirnavo
Kalabaka
Aggropotamo
Fluvius Peneus
Fluvius Salamvria (Peneus)
M. Kamvunia
M. Kuvelei
M. Lacha
M. Vulgareli
M. Kuvelei
Mt. Kuvelei
Mt. Lacha
Mt. Vulgareli
Mt. Kamvunia

Kalabaka
Tricala
Trikala
Tirnavo
Elassona
Karditza
Sopiades
Palamas
Karpenisi
Agrinion
Varibopi
Aga
Preveza
Arta
Larissa
Volos
Lamia
Thebes
Athens
Patras
Corinth
Kozani
Grevena
Florina
Edessa
Naoussa
Veria
Katerini
Kilkis
Serres
Drama
Kavalla
Xanthi
Komotini
Alexandroupolis
Orestias
Salonika
Chalcis
Livadia
Amphissa
Missolonghi
Agrinion
Patras
Pyrgos
Tripolis
Sparta
Kalamata
Nauplia
Argos
Corinth
Megara
Eleusis
Piraeus
Athens
Thebes
Livadia
Chalcis
Lamia
Volos
Larissa
Trikala
Karditza
Kalabaka
Metsovo
Janina
Arta
Preveza
Igoumenitsa
Corfu
Zante
Cephalonia
Ithaca
Santa Maura
Aetolikon
Vonitza
Prevesa
Parga
Sulli
Souli
Zalongo
Kastri
Delphi
Amphissa
Lepanto
Naupactus
Salona
Thermopylae
Lamia
Domokos
Pharsalus
Farsala
Velestino
Volos
Pelion
Ossa
Olympus
Pieria
Katerini
Veria
Naoussa
Edessa
Florina
Kastoria
Grevena
Kozani
Servia
Elassona
Tirnavo
Larissa
Karditza
Trikala


Tyrnavo
Kazaklar
Bel Tatar
Orman Sifliki
Kuluri
Dendra
Catalar
Damasi
Gonnitza
Baglar
LARISSA
Amarlar
Kuzokeri
Hadzihalar
Hasan Tatar
Tsarmacli
Ratzilar
Buglar
Sabalkoi
Suletzi
Caraughel
Sortzana
Hadzobasi
Simikli
Tzuri
Giugunari
Demerli
Vasili
Pazarak
Mavrachades
Chaikul
Farsagna
Derenkli
Ineli
Anlanlar
Vardali
Balabani
Domokos
Zagoriani
Derveli
Palamas
Monti
Thianokladi
Lamia
Stylis
Kipati
Maimuli
Nigmata
Topuslar
Karalar
Sarimusi
Sarchanlar
Nebogler
Kapatsilar
Suflar
Hadzohasi
Bektsiler
Mikrochalikoi
Petra
Gerli
Abdulari
Hadzimusi
Kuru
Dabagli
Kalaxisi
Karademertzi
Hadzibei
Duviatan
Karabairam
Krasopoyo
Soratsi
Ondoklari
Artuan
Tsangli
Ostrovo
Velestino
Hagios Ghiorgios
Demini
Pallouro
Sesoulos
Perperli
Kitiki
Stakasi
Turkomusti
Chasambi
Halmiros
Nea Minzola
Platanos
Kopsi
Surpi
Pteleon
Gavriani
Gardikion
Griades
Tarsina
Asclepion
Canale
GOLFO
GOLFO DI LAMIA
VOLO
Ano
Kanalia
Lago Nero
Makrinitza
Pelion
Ossa
Olympus
Thessalia
Kapiste
Nivolianis
Agia
Skiti
Sekia
Potamiari
Skiathos
Plasma
Kastri
Valcarini
Alifoklaki
Petrokhori
Ano Seteçli
Kato Seteçli
Kiotzi
Mantoudi
Gura
Drachani
Mesochorion
Zagoriani
Derjan Karia
Kato Kalivia
Zelli
Sulaki
Mikron Kolari
Mega Kolari
Kephi
Andrimo
Kato Kalivia
Mega Kolari
Mikro Kolari
Tsaoulis
Tsaoulis
Mega Kolari
Mikro Kolari
Tsaoulis
Mega Kolari
Mikro Kolari
Tsaoulis
Mega Kolari
Mikro Kolari

Tyrnavo
Kastaklar
Bel Tatar
Orman Sifliki
Dendra
Catalar
Gunikus
Mikron
Zarkos
Kurbali
Georgamades
Klokotos
Kozokeri
Hadzihalar
Hasan Tatar
Amarlar
Malmuli
Sarchanlar
Kapatsilar
Suflar
Nebogler
Tsarmacli
Hatzilar
Hisarlik
Mikrochalibei
Abdulas
Palamas
Kochari
Huglar
Suletzi
Subasi
Baban
Caraoghel
Sarijaza
Hadzobasi
Simikli
Karadzhertzi
Koloxini
Karditza
Kapulsi
Falsomkastron
Delivrdi
Salmi
Sophades
Kalliphoni
Sakkitas
Gervesi
Pasarak
Navvanhades
Chaikul
Zagliani
Paliori
Lukso
Chalambresi
Asilanlar
Tsiamurli
Demerli
Vasili
Mega
Farsagha
Derenkli
Inceli
Tsangli
Kiliki
Turkomusti
Kister
Vardab
Furnari
Domokos
Mantzuli
Chilindo
Gura
Drachani
Palamas
Dervesi
Zagoriani
Ano Setegli
Mikron Kelari
Hypsala
Phurna
Hepsina
Monsi
Varibopi
Thiampkladi
Lamia
Stylis
Aga
Kipati
Sulaki
Griziades
GOLFO
30°
20°


VOLO
Ano Volo
Makrinitza
Portaria
Agria
Drakia
Milies
Zagorades
Nleochori
GOLFO DI VOLO
Argalasti
Lavros
Trikeri
Canale Trikeri
I. Peristeria
Palaeotrikeri
Tsangli
Artaki
Platanos
Surpi
Pteleon
Tsamaki
Gardikion
Canale di Orei
I. di Negroponte
Stylis
Gerli
Petra
Kanalia
Lago Karla
Velestino
Ondokiaki
Hadzimanos
Farsala
Palamas
Nezeros
Kastri
Phthiotis
Sklithron
Plasia
Skiti
Agio
Nivolianis
Kapsala
Karalar
Hadzihalar
Ghiorgios
Demini
Nea Minzela
Kophi
Gavriani
Orisades
Rachesi
Achalion
Trikeri
C. Pari
C. Kanalia
C. Stavro
Lago Karla
Canale di Orei
GOLFO DI LAMIA
39°
30'
22°

The battle extended along the entire pass, over 20,000 men being engaged, the combat turning upon the possession of the Greek blockhouse, which was obstinately defended. Several vigorous attacks were made without success, but at last, about 9 o'clock, the Turks by a magnificent dash took the blockhouse by assault at the point of the bayonet.

At half-past 10 o'clock Edhem Pasha brought up his reserves to the foot of the pass. Two attempts were made to bring up the horse artillery, but the precipitous nature of the ground rendered this impossible.

By all accounts the Turkish soldiers fought sturdily with calm determination, but showing a good deal of dash when called upon for decisive action. There was no trace of excitement among them, and at every point they displayed splendid physical stamina. Then the battle had been proceeding uninterruptedly for twenty-four hours. The artillery made excellent practice; at a range of three miles 900 yards the accuracy has been remarkable. This arm has rendered the Turks great service, as the Greeks had comparatively little artillery and were soon obliged to retire before the deadly fire of the Turkish guns, which Riza Pasha directed with masterly skill.

Reuter's agent, who has given a very spirited account of the battle, was greatly struck by the coolness and discipline of the Turkish soldiers in the hottest of the fight. As an instance he cited an incident which he saw himself. Four Turkish soldiers were advancing in skirmishing order under a deadly fire. They had become detached from the main body, but nevertheless continued to advance with perfect self-possession amid a perfect hail of bullets. Then one was hit and fell; the second and third in turn also fell, but the fourth calmly went on firing without the slightest regard for his personal safety until the Greeks retired. The battle was waged with admirable courage and determination on both sides. The whole pass rang with the roar of artillery and the rattle of musketry, and at 8 o'clock in the evening the Turks had practically gained possession of the entire pass, having carried all the heights dominating it from Meckehe to Papa Livado. They also occupied all the chief defiles.

The battle came to an end about midnight on Sunday, the Greeks being completely driven back into the plain of Larissa, and the whole line of the heights as far west as Skumpa being held by the Turks. The last height commanding Turnavo was captured by the Turks on Monday, and an infantry advance supported by cavalry began, the soldiers cheering lustily.

The *Times* correspondent states that the Greeks entrenched themselves strongly in the plain of Larissa north and west of the town, and at Zarkos heavy fighting continued.

There was a long struggle also at Karya, each side in turn advancing and retreating across the frontier. But the Greeks, according to this correspondent, must very soon retire or be surrounded by the reinforce-

ments sent to Hamid Pasha's division, which had been fighting for two days and nights.

THE FIGHTING AT REVENI AND DAMASI.

From Athens comes news of Greek successes a few miles from the Maluna Pass, which yet lack confirmation in all their details. The contest occurred at a place called Reveni, about 12 miles northwest of Larissa, where it would seem a series of skirmishes on Sunday was followed up by a Turkish attack in force upon Monday, on which day, it is alleged, not less than 10,000 to 14,000 troops under the personal leadership of Edhem Pasha attempted to carry it. Seven assaults, it is stated, were delivered, but they were repulsed by the Greeks, who finally assumed the offensive and advanced in the direction of Damasi. A telegram from the Crown Prince declared that the Turks at this point were "completely and finally repulsed." It was further asserted in Athens that a second Greek column, which had already crossed the frontier at Bonghazi, about five miles to the north-east, was supporting the force from Reveni, and that they were supposed to be concentrating upon Damasi, from which point, it was thought in the capital, they would command the road to Elassona. The road is, however, commanded by the heights of Vigla, which do not appear to have been captured by the Greeks, and the Crown Prince telegraphs that the Greek army "maintains its positions." According to a despatch from the prefect at Larissa, the attack upon Vigla was being pressed vigorously by the Greek artillery posted at various points on the heights, and the capture of the position was expected. The same despatch states that Prophetes Elias and two other Turkish outposts have been taken, that at Nezero the Greek artillery have completely destroyed two Turkish companies, and that the only survivor, a captain, has been taken prisoner. The Greeks then possessed themselves of the strong Turkish position of Merkezi, two miles on the Turkish side of the frontier. Further news respecting the conflict at Reveni was anxiously awaited in Athens.

THE SITUATION ON THE WEST.

Orders were issued on Sunday evening for the western division of the Greek fleet to bombard Prevesa. The entrance to the Ambracian Gulf was blocked by the sunken steamer *Macedonia*, which was blown up with dynamite, and the battle-ship *Spetsai* was ordered to proceed from Patras to Prevesa to open hostilities. The bombardment was opened with vigor, but, as reported from Athens, rough weather interfered with the progress, though the Hamidieh and Pantokrator forts were much damaged. Prevesa commands the opening of the gulf and the approach to the Arta River, and the Greeks attached much importance to the possession of it. Firing ceased at half-past five on Tuesday afternoon, and official telegrams stated that the fire of the *Basileus Georgios* and *Nauarchos Miaulis* did considerable damage to the Turkish forts. The

Spetsai has since left to join the eastern squadron, but her consorts were to reopen the bombardment.

There has been a great deal of heavy fighting also at Arta, where there was an artillery duel with considerable loss on both sides on Monday, and after a sharp fight a large Greek force crossed the river and advanced into Epirus. Seven hundred irregulars also landed at Syrako, in Epirus, and marched in the direction of Fillipiada. Other Greek bands have also invaded Epirus. A column which crossed the Arachthos at Bani, after capturing the villages of Neokhori and Bakhikalamon, entrenched itself in strong positions. A telegram from the prefect of Arta to the Prime Minister states that the fortress of Imaret, near Arta, was captured by Col. Manos after an obstinate engagement.

The Greek army then advanced and occupied Fillipiada, which had been set on fire by the Turks. The Greeks are making a strong effort to score a success in this direction, the purpose being to reduce Janina, upon the road to which lies Fillipiada, and cut the communications of Prevesa. Pentepigadia is the immediate object.

ON THE EAST.

An attempt was made by the Greeks to cut the Salonica railway, and a band of men, apparently very ill-provided, landed for the purpose, but they were defeated and many of them captured. The purpose of the Greek eastern squadron in the Gulf of Salonica has not been fully revealed. Platamona, where a powder magazine was exploded, and Lepthokarva, were bombarded on Tuesday. The torpedo flotilla under Prince George has been sighted off the mouth of the Peneios. The populace in Athens has manifested bitterness in regard to the apparent inaction of the fleet. The exact position of the eastern squadron is unknown, but it is believed to be preparing a descent upon Katerina or Platamona. No information is forthcoming at the Ministry of Marine, and various rumors are current, but there is no sign as yet of a purpose of seeking the Turkish fleet, which, indeed, so long as that force lies inactive, is unnecessary. A second Turkish division, consisting of three armed transports and a torpedo-boat, left the Bosphorus on Wednesday.

It is reported in Berlin that the Czar considers the immediate despatch of the Russian Black Sea fleet to the Dardanelles as inevitable. The permission of the Porte to pass through the Dardanelles is stated to have been requested. The Baltic fleet is also alleged to be ready to start, having received sealed orders.

A correspondent of the *Daily Graphic* thus estimates the forces :—

TURKEY.

The organization of the Turkish army is, like that of most of the continental Powers, based upon the territorial system and on universal conscription. The Ottoman empire, for military purposes, is able to

draw on a population estimated at 20,000,000, and it is considered, according to the latest and best authorities, that the total strength on mobilization for active service would fall but little short of 700,000 of all ranks. Briefly the liability for service last for 20 years, the period being divided as follows:—With the colors, four years (Nizam, or active); 1st Class Reserve, two years (Army); 2d Reserve, eight years (Redif, or 2d Reserve); 3d Reserve, six years (Mustehfuz, or 3d Reserve). Total, 20 years. The headquarters of the 1st, 2d, and 3d Ordus are, respectively, Constantinople, Adrianople, Monastir, this latter army corps being quartered in the immediate theatre of the present hostilities, namely, Roumelia, Macedonia, and the Turko-Greek frontier. The 4th Ordu is located in Kurdistan and Armenia, the 5th in Syria, and the 6th on the Persian border. Owing to the enormous difficulty of transport it is improbable that, except in great national emergency, these last-named Ordus will be called upon for service in Europe, but the mobilization of the first three will unquestionably suffice to grapple with any force that Greece can possibly bring into the field. For the purposes of comparison, then, we will only deal with the forces comprising the first three army corps. Each Ordu, on a war footing, forms one Nizam or Regular army corps of two divisions (each division consisting of 17 battalions) of infantry, one division of cavalry (six regiments), together with 15 batteries of field and horse artillery. Ignoring engineers and other auxiliary units, each army corps will stand as under: 34 battalions of infantry; 24 squadrons of cavalry; 90 guns, field and horse artillery, including six mountain batteries. Concurrently with the declaration of war the Redif or 2d Reserve have been ordered to mobilize, and this act will give each of the three army corps an additional 30 battalions of infantry at the very lowest estimate, and still leave a large margin available for garrison duty outside the seat of war.

Armament.—The Nizam infantry are armed with the .3 magazine rifle (Mauser), but the Redif battalions will probably take the field with the Martini-Peabody armed with the four-edged bayonet. Each man will carry from 200 to 250 rounds of ammunition. The cavalry carry a carbine, sword, and revolver, and in some regiments a lance in addition. The carbine will be partly of the Mauser pattern and partly of the Martini-Peabody make, though in some regiments the Winchester repeater will be used. The magazine of this latter weapon carries 12 rounds when filled. The horse artillery is armed with 7.5 Krupp guns; the field artillery are armed with guns of the same make but of a new and heavier pattern. The mountain batteries are armed partly with the Whitworth muzzle-loading rifle and partly with 6.9 cm. Krupp guns. The gunners and drivers of horse artillery are armed with a sword, and gunners of the field artillery with a sword-bayonet.

Strength.—The force to which Greece will shortly find herself opposed will stand approximately as follows:—Infantry, 177,000; cavalry, 11,500; artillery, 6260, and 270 guns. Total, 194,760 and 270 guns.

GREECE.

The organization of the Greek army, like that of Turkey, is based upon general conscription, but, with a population not exceeding one-third that of London, the annual levy is not very large. For organization purposes the country is divided into three districts as follows:—(1) Larissa: 10 battalions of infantry, 1 regiment of cavalry, 4 batteries of field artillery and 3 mountain batteries; (2) Missolonghi: 8 battalions of infantry, 1 regiment of cavalry, 3 batteries of field artillery and 3 mountain batteries; (3) Athens: 10 battalions of infantry, 1 regiment of cavalry, 4 batteries of field artillery and 3 mountain batteries. Total, 28 battalions of infantry, 3 regiments of cavalry, 11 batteries of field artillery and 9 mountain batteries. The figures given above represent the peace establishment, which, on the recent mobilization, has been augmented by 28 additional infantry battalions, together with a few squadrons and batteries of artillery. Under normal conditions the infantry is divided into 10 regiments (pezikoi), or 20 battalions (tagma) of the line, and 8 batteries of rifles or light infantry (Evzoni). The Evzoni wear the picturesque national dress, which consists of a white pleated kilt, white shirt, light-colored felt leggings, and breeches that reach to the waist, sandals turned up at the toe, an ornamented light-colored vest with loose hanging sleeves, and a red fez with black tassel. Strange to say, however, the officers wear the modern dress of the infantry of the line. Every man becomes liable for service on reaching his majority, and the active army reserve includes all between the ages of 21 and 33 years, whether they have served with the colors or not. The principle of service is somewhat akin to that of Germany and France, that is, two years with the colors, 10 years in the 1st Reserve, eight years in the 2d Reserve, and 10 years in the 3d Reserve, but there all similarity ends. As a matter of fact the period of training seldom exceeds 15 months, and a large portion are passed to the gendarmerie after some six months' service. The 2d and 3d Reserves only exist on paper, and the last-named (useless and over-aged) can only be called upon in case of invasion. It is doubtful if either could be armed and equipped. Excluding non-combatant units such as transport, engineers, and departments, it will be seen that the peace establishment consists of 28 battalions of infantry, 3 regiments of cavalry, 11 field and 9 mountain batteries of artillery. On the present mobilization, however, the distribution will probably stand thus: 56 battalions of infantry, 6 regiments of cavalry, 30 batteries of artillery.

Armament.—The infantry are armed with the Mannlicher magazine rifle, but the Reserve battalions will be armed, at least in part, with the .433 single-loader Gras rifle, which is sighted to 1300 yards, with the sword-bayonet. The cavalry (Hippikos) are armed with carbine and sword. The horsemanship is said to be very indifferent. The artillery (Pyrobolikos) is armed with 9-pr. and 12-pr. Krupp guns. The mountain batteries of this arm should prove of great service at the present juncture.

Pay.—It is worthy of remark that, while the Turkish soldier has no ascertained scale of pay, the Greek soldier's remuneration, such as it is, is a recognized liability. Allowing for the rate of exchange the following may be regarded as the maximum pay of the infantry:—Colonel, £136; lieutenant-colonel, £112; major, £100; captain (first and second class), £68 and £53; lieutenant, £40; and sub-lieutenant, £34 per annum. Sergeant-majors, sergeants, corporals, and privates receive, respectively, 6d., 5d., 4d., and 2½d. per diem. Some two years back a reduction of these meagre pittances was contemplated.

Strength.—Bearing in mind that the 2d and 3d Reserves, if mobilized at all, would only be utilized for home defense, the following estimate of numbers available for hostilities on the Turkish frontier is, if anything, over the mark:—Infantry, 80,000; cavalry, 3000; artillery, 4000 and 200 guns; engineers and other units, 6000. Total, 93,000 and 200 guns.

Summary.—The field state of the two armies when the mobilization is completed will be as follows:—Turkey: 177,000 infantry, 11,500 cavalry, 6260 artillery, 270 guns. Greece: 80000 infantry, 3000 cavalry, 4000 artillery, 200 guns. These figures speak for themselves.

During the last week in April irreparable disaster fell upon the Greek army. Edhem Pasha, making admirable strategic and tactical use of his forces and proceeding with circumspection, doubtless knowing well the effect of prolonged fighting upon the unseasoned troops of Greece, had conducted an enveloping attack upon the main position before the Maluna Pass, and, with comparatively small loss to the Turkish forces, compelled a precipitate retreat southward from Larissa, which rapidly degenerated into a panic-stricken rout, towards a new position at Phersala, at the southern end of the plain of Thessaly. The defense of the frontier, pierced at its centre, collapsed, and the Greek forces had no choice but to fall back, and remnants of the army fled to Volo and Trikhala. At Larissa, in 48 B. C., Pompey was joined by Scipio and fell back to Phersala—then Pharsalia—whither he was followed, and where his forces were routed by Cæsar. On the west the Greeks scored some success in Epirus, but there are grounds for believing that the Turks made no serious defense, and whatever may have been accomplished on that side, is quite overshadowed by the disaster at Mati. Moreover, the Greek advance in that direction has now wholly collapsed, having failed in its political and military purpose of fomenting disaffection, and thus threatening the Turkish communications. Prevesa, which was expected to fall a week ago, has stoutly held out, and the other bombardments by the Greek fleet of towns on the east and west coasts have been without perceptible effect upon the course of the campaign.

At the end of last week it was foreseen that the capture of the Maluna Pass would lay open the plain of Thessaly to Turkish advance. The news from the seat of war was of the general movement of the invading army as consisting in a steady advance into the plain. Edhem Pasha

was cautious, and contented himself with occupying in succession the small posts held by the Greeks. The Greeks did not feel strong enough to risk a general engagement, and were gradually retreating before him. There is some reason to think that the necessity for a retreat was foreseen at Larissa and in some measure had been prepared for.

THE BATTLE OF MATI.

After the loss of the Maluna Pass the Greeks fell back slowly, maintaining their position obstinately on Mount Kritiri, and holding the place called Mati, north of Tyrnavos. This defensive position was on the plain in a long line, forming the base of a triangle of which the Maluna Pass was the apex. Mati was situated between the first and second batteries, counting from the left, a little in advance, and directly facing Karatsioli at the foot of the mountains. In front of this village, already partly destroyed, was a Turkish battery.

The engagement opened on Friday morning, April 23, with several discharges from this battery, but the discharges went over the heads of the troops. Gradually the range was more accurately obtained and other Turkish batteries opened fire on Kutavi and Deliler, the Greek batteries replying briskly. For hours this artillery practice went on almost without intermission and with very little effect on either side. At the end of the day the Greek casualties amounted only to two killed and perhaps a dozen wounded. At about five or six o'clock in the evening the Turkish cavalry and infantry began to move at the base of the hills, but when the sun went down towards seven o'clock it was generally believed by the Greeks that the fight was over for the day.

About sunset, however, the headquarters staff perceived that the right wing was being turned by the Turkish cavalry. Suddenly a strong force of these made a rush from behind the wooded surroundings of Kutavi and joined several other squadrons of Turkish cavalry, which had evidently pushed on from Dereli, in the vale of Tempe. The invading Turkish divisions from Nezero and Rapsani thus joined hands. Almost immediately afterwards the villages of Kutavi and Deliler were set on fire, and the day's operations terminated amidst a lurid glow from the burning houses. Accordingly orders were issued that, as soon as it became dark, the force should retire on Larissa. At the same time this intelligence was transmitted by flash signals to the Greek troops on the heights beyond in order that they should take the necessary steps for their own safety. These orders reached the first line about 8.30, and the retiring movement immediately began. The men were tired, hungry, and sullen, having been kept all day under artillery fire without the excitement of real fighting, and in consequence of some little accident the regular retreat degenerated into a disorderly stampede. The *Times* correspondent believes that in this case the panic was caused by the flash signals on the heights, which were interpreted to mean that these positions were being taken by the Turks. Simultaneously a cry was raised that the Turkish

cavalry were advancing, and in the darkness it was impossible to distinguish friend from foe, and terrible scenes resulted.

THE ROUT.

The night had been very dark, but in the southeast a red glare indicated where the villages of Kutavi and Deliler were burning. Reuter's correspondent has given a vivid account of what happened. As we proceeded, he says, we passed several batteries of the Greek artillery, mule trains, carts, and wagons laden with household effects, and bands of crying villagers. The women and children were in a pitiable condition, and all, soldiers and civilians, were hopelessly mixed, the order of retreat having been completely lost. Men of all arms were intermingled, and the confusion was increased by the shouts and rushes of the Evzones and irregulars in every sort of strange dress.

At the juncture of the Tyrnavos and Kazaklar roads the straggling lines of both divisions of the retiring army were heaped upon the road, and upon the ploughed land on either side. Sullenness had now given place to clamor, and the disappointed and dispirited men forgot their weariness in imprecations against their generals and officers. The retreat had become a rout.

Suddenly, above the din of the confused masses in the road and adjoining fields, there came a roar, sharpening into a fierce, sustained yell, rolling with lightning speed from the distant rear. There was no rear guard, and so far as the correspondent had observed no screen of cavalry covered the retreat. In a few moments, above all the noise and shouting, could be distinguished prolonged cries of "The Turks are upon us." There was hardly time to realize what was happening when a dozen or more horsemen, accompanied by a few riderless steeds, appeared on the left at full gallop, shouting in a perfect frenzy, "Run, run! the Turks are here."

Up into the night air then arose an agonized roar, fairly paralyzing the imagination, and destined to remain in the memory for ever. The stampede was instantaneous. The animals were lashed by the men. Women, children, and soldiers pell-mell made one mad rush forward. Many fell and were trampled to death. Vehicles of every description were overturned, mixing together in inextricable confusion, bedding, furniture, ammunition, horses, donkeys, oxen, buffaloes, in the depths of the black night. Then began a perfect pandemonium. In their insane terror, soldiers, irregulars, and armed peasants commenced to fire their rifles in all directions. From front and rear, right and left, bullets whizzed, the reports being scarcely heard above the roar of human voices and the screaming of the terror-stricken animals. The whole place was lit by the constant flashes.

The way was strewn with ammunition boxes, broken carts, furniture, bedding, soldiers' blankets, and tin pannikins, the latter causing a constant clattering as they were kicked by the horses' feet, which also be-

came entangled in the blankets and other litter. The horses continued to gallop frantically among the flying crowds. Many of them were riderless. Deserted guns, munition wagons, and carts added to the general obstruction. The traces of the horses had been cut to enable the drivers and fugitives to fly more speedily. Those who were without horses attempted to dislodge those who were mounted. In some cases they succeeded, and, taking the places of the dispossessed riders, disappeared in the dark. The entrance to Larissa is by a bridge crossing the river Peneios, and here the block of vehicles, guns, men and horses was for hours terrific and agonizing.

When the correspondent entered Larissa the streets presented scenes of indescribable confusion. Troops of all arms, inextricably mixed, threw themselves down in utter exhaustion, heedless to the calls of voice or trumpet to fall in. The inhabitants had received news of the disaster about two o'clock in the morning, and had rushed from their houses in wild disorder. An Italian belonging to the Foreign Legion added to the confusion by attempting to blow out his brains. The mere mention of the Turks was sufficient to create a frenzied rush in any direction.

Five newspaper correspondents were involved in the stampede, and all miraculously escaped. They were the representatives of the *Times*, *Illustrated London News*, and *Manchester Guardian;* Lieut. Western, who is acting as correspondent for a newspaper in Stockholm; and Reuter's correspondent.

When the determination to abandon Larissa was made known another stampede of the civil population occurred. Women, children, and even men went about drawing their hands across their throats to show what might be expected from the Turks if they arrived, and in an incredibly short space of time the roads leading west and south to Volo and Phersala were crowded with the panic-stricken population, vehicles and animals of every description bearing household effects, while less fortunate fugitives carried bundles of such things as they had been able to save on their backs. "It was lamentable to hear even the most wretched of these fugitives deploring the fate of 'Poor Greece,' being evidently quite as much concerned on account of the National disaster as of their own individual ruin."

AT LARISSA.

At seven o'clock on Sunday morning, April 25, a Turkish cavalry regiment, accompanied by Grumbkoff Pasha, inspector-general of artillery, Mustapha Natik Bey, aide-de-camp-to the Sultan, Sefulah Bey, colonel attached to the headquarters staff, and Sabit Bey, of the same rank, entered the town of Larissa after a short engagement on the river Peneios. They captured six large guns in the fort, a mountain battery, and much material. The town remained quiet, the Turkish commandant having enforced the strictest discipline. Sentinels were posted in every street and allowed no one to enter the houses or to pass without giving

the word. One house caught fire, but by the efforts of a cavalry picket the flames were prevented from spreading. The conduct of both officers and men was admirable, and the discipline exemplary. The Turks took some 400 prisoners, and there were about as many inhabitants of the town left behind. According to their story, for three days before the Turkish occupation the town was given over to general pillage by a mixed rabble of disbanded Greek soldiers, thieves, and revolutionary members of the Ethnike Hetairia. At last, the panic increasing with the nearer approach of the Turkish army, they ran from the town in disorderly flight and took many of the inhabitants with them. There was panic also at Volo, which is reported to have been abandoned. The Turkish cavalry scouts have been reported at Valestino, on the Volo railway.

THE SITUATION IN EPIRUS.

There is no decisive news from Epirus, but there can be no doubt that the Greek advance towards Janina has either been suspended or checked. After the artillery duel at Arta the Turks fell back, and Col. Manos advanced on Pentipigadia, where there has been a good deal of fighting. A dispatch from Arta, dated 6 A. M. on Tuesday, April 27, says: "The execution of the original plan of invading Epirus by successively moving on Pentepigadia, Sikoron, Janina, and Metsovo has been temporarily suspended in consequence of the events of yesterday."

According to despatches from Arta, the mayors have armed the peasants in the villages to the west of Philippiada. The Greek force in Epirus is said to be made up as follows: Infantry of the line, 1200 men; three battalions of Evzones, 3000; engineers, 1600; three squadrons of cavalry, 600; three squadrons of mounted infantry, 500; auxiliary branches, 4000; artillery, 2500; irregulars and volunteers (varying in strength each day), 3000 or 4000.

The troops are, however, losing ground, and have been obliged to fall back as far as Louros. They are reported to be short of supplies, and there seems to be no doubt that the Greek commissariat in Epirus has been very badly managed.

THE BOMBARDMENT OF HAGIOI SARANTA.

The following are particulars of the attack on Hagioi Saranta, on the coast of Epirus. The western squadron proceeded to the Bay of Hagioi Saranta, where large stores of munitions of war and provisions for the Turkish army in Epirus had been accumulated. The fighting began with the bombardment of the place by the ships. Two hours later flames were seen rising from one of the largest storehouses. The Turks guarding the place, estimated at about 600 men, then took refuge in the fort. About mid-day detachments under the command of three lieutenants were landed under the cover of the guns of the ships and of the torpedo flotilla. The landing party first occupied all the heights in the immediate vicinity, and then, after surrounding the town, set fire to the

remaining stores and buildings, all of which were completely burned down. Before the landing of the Greeks, the garrison, who, as already stated, at first took refuge in the fort, retired to the hills, whence they for a long time kept up a constant fusillade. Finally, however, the ships' guns silenced them and they were compelled to withdraw out of range. During the bombardment fifty Christians took refuge in a house over which they hoisted the white flag. The vessels were careful not to hit the building, and at the end of the action the Greek troops took charge of the Christians and took them to Corfu. The Greeks had only two sailors wounded in the fighting. The amount of ammunition, provisions, and other stores destroyed must have been very large. There were 1600 bags of flour on the wharves.

TURKISH AND GREEK ARTILLERY.

The present organization of the Turkish artillery is barely seven years old. It was in fact, given effect to by an iradé dated Oct. 20, 1890. This organization, strictly modelled on German lines, has as yet been only applied to the first five army corps, or "orders" as they are technically termed, and in each of these territorial districts there is now a division of field artillery, composed of three brigades of two regiments each. However, as far as the campaign against Greece is concerned, the 6th and 7th Orders need not be taken into consideration, for they are respectively stationed at Bagdad and Yemen. The 1st brigade of each division has attached to it one battalion of horse artillery and a small independent batch of machine guns, to act, it may be presumed, as a kind of flying battery; but the duties of this special machine-gun establishment do not appear to be at all clearly defined. Each regiment of artillery is split up into two groups of three batteries apiece, and to avoid confusion it should be mentioned that the Turkish military authorities give these units the same names as those applied to the infantry; that is "'thabour" (battalion) for the group, "belauk" (company) for the battery, each of which has six guns. Thus in each order there are six regiments, numbered 1 to 6. Regiments 1 to 4 consist altogether of field artillery; Regiments 5 and 6 have each one battalion of field artillery and one of mountain artillery. Therefore, putting aside the question of the flying batteries of machine guns, whose existence seems rather apocryphal, we find, says the *Standard*, that each of the first five orders has to its credit:—

Horse artillery,	3 batteries	18 guns
Field	30 "	180 "
Mountain	6 "	36 "
Total	39 "	234 "

Thus the entire strength of horse, field, and mountain artillery, with the first five orders, which are now fully mobilized and ready to act against Greece, will be as follows: 15 horse artillery batteries, 150 field

batteries, 30 mountain batteries, with a grand total of 1170 guns. All the artillery regiments of the first five army corps are exactly on a line as regards their composition, and the cadres are quite complete. These cadres include: (1) The regimental staff, composed of one commandant, one adjutant, one lieutenant, carrying the regimental guidon; and in the first regiment of each brigade only, one officer belonging to the Turkish equivalent for an army service corps. The first regiment of each brigade also possesses a master saddler and a master farrier; (2) the group of batteries staff, composed of one major-commandant, one adjutant, one clerk, and one chaplain. The establishment of a field battery is as follows: One captain, one lieutenant, two sub-lieutenants, 22 non-commissioned officers, 110 other ranks; total 137, with 100 horses. A horse artillery battery has a slightly larger establishment of non-commissioned officers and men, and about 170 horses. The mountain batteries are placed on the same footing as that of the field. Each horse and field battery is supposed to have six ammunition wagons. The whole of the Turkish field artillery is now armed with coiled-steel Krupp guns, but there are two different calibres. The horse artillery is equipped with 7.5 cm. (9 pr.) Krupp guns, and, from last year, the armament of the field artillery, with 8.7 cm. (12 pr.) weapons of the same pattern has been completed. All these guns are breech-loaders of the latest design, and exactly the same as those used in the German army, as, indeed, are their limbers and gun carriages. The following are the principal details of the two calibres:—

	7.5 cm.	8.7 cm
Weight of gun	600 lbs.	900 lbs.
Charge of powder	2 lbs.	3 lbs.
Weight of ordinary shot thrown .	8¼ lbs.	12¼ lbs.
Weight of shrapnel thrown .	8½ lbs.	14 lbs.
Number of rounds carried . .	85	180
Muzzle velocity	1545	1600 ft. per sec.
Sighted up to	4500 yds.	5000 yds.

On comparing the above with other modern field-guns, we find that the new Woolwich 12 pr. comes first with a muzzle velocity of 1720 ft. per second, while the French field-gun shows 1608 ft. and the Russian 1350 ft. To a certain extent all modern field-guns are about on a par, but Krupp, to get the advantage of centring, makes his grooves in the rifling narrower at the muzzle than at the breech; hence the velocity of rotation is continually augmented as the projectile travels towards the muzzle. The Turkish mountain batteries are nominally all armed with 6.9 cm. Krupp guns, but there are a few batteries which still have the 7 cm. Whitworth muzzle loader. The Turkish government has also just purchased 72 12 cm. howitzers, with which it is evidently intended to arm 12 field batteries. The uniform for all the artillery consists of a dark blue tunic with rows of black lace across the breast, scarlet facings, light grey overalls with a broad red stripe, and, as a relief from the ubiquitous

fez for head-dress, a lambskin busby with blue cloth top. Both gunners and drivers of horse artillery have a sword; in the field artillery gunners have a sword-bayonet instead.

The artillery of the Greek army—"pyrobolikos"—consists of three regiments, and, as far as their armament is concerned, they are quite as up-to-date as their adversaries, both possessing, in fact, identically the same weapons. But there only exist 20 batteries altogether—11 field and 9 mountain—so it is only safe to assume that the Turks must always possess crushing superiority in this arm. The 1st and 2d regiments have each four field batteries and three mountain batteries, these latter, with the 7.5 cm. Krupp, being decidedly better equipped than their Turkish contemporaries. The 1st Regiment of Artillery has two field batteries with the 8.7 cm. Krupp; the other field batteries have the 7.5 cm. The 3d Regiment of Artillery has three field and three mountain batteries, all armed with the 7.5 cm. Every battery consists of six guns. The artillery uniform is a dark blue jacket, dark blue képi, dark blue booted overalls with narrow red stripe, dark blue cloak. The mountain artillery wear a dark blue double-breasted tunic, and both carry a red plume in their képis. In field batteries drivers have a sword, and gunners a sword-bayonet. In mountain batteries the men carry a Gras carbine slung over the shoulders. The exact war establishment of a battery cannot be definitely ascertained, but it may be approximately estimated at 150 of all ranks.

The summary, therefore, of the artillery forces of the two combatants will be found below, and by referring back it may be seen that one army corps of the Turkish forces is accompanied by double the number of guns possessed by the whole Hellenic army:—

	H. A. Batteries.	Field Batteries.	Mountain Batteries.	Guns.	Total Strength of Men.
Turkey (five army corps only taken).	15	150	30	1170	27,120
Greece	Nil	9	11	120	3,000

At the end of last week, May 1, the Ministry of M. Delyanni was dismissed, and the new Ministry of M. Ralli, upon the report of M. Tsamado, Minister of War, and M. Theotoki, Minister of the Interior, who have visited Phersala in order to investigate the condition of affairs, has resolved to continue the war. Meanwhile the Powers stand ready to intervene, and the end can scarcely be delayed. Since the capture of Larissa events in Thessaly have moved somewhat slowly. Edhem Pasha has not followed up his advantage with the swiftness that might have been expected, but he has prepared, as before, for a decisive advance and gathered his forces for an effective blow. There has been much heavy fighting at the important position of Velestino, where the Greeks, under Col. Smolenski, for many days held their own. In Epirus the advance under Col. Manos has collapsed entirely and the Greeks retired to Arta in a kind of sullen panic, the result being a dis-

aster to the Greek arms, though with no considerable loss of life, second only to the terrible rout at Larissa. The Turkish main advance has been on Phersala, and, after a hopeless battle the Greeks have fallen back on Domoko. Col. Vassos has been recalled from Crete to replace Col. Manos and Col. Constantinides returns with him to assume the post of Chief of the Staff, which Col. Smolenski has declined. They are accompanied by 12 of the more promising subalterns of his army, who are required to officer the newly-formed regiments of volunteers which are to be hastened to the scene of operations. Greece will presently have all her available forces in the field, while Turkey continues to bring up constant reinforcements, the road from Salonica to Larissa being covered with troops. It has been decided to raise the strength of the army in the European provinces to 300,000 men in order to be prepared for all emergencies, and also as an experiment in mobilization. Including the troops stationed in Anatolia, Turkey will shortly have under arms about 500,000 men. Transports with Turkish troops on board continue to pass through the Dardanelles on their way to the Ægean, and effective resistance on the part of Greece seems impossible.

With reference to the recall of Colonel Vassos some strange statements have been published by a journal supposed to have relations with the new Greek government. It asserts, on the authority of some Cretan insurgents who arrived at the Piræus, that dissensions have broken out among the superior officers of the army of occupation, in which the Cretan chiefs have taken part. Colonel Vassos is stated to have advised the Cretans to accept, for the present, autonomy under Prince George, while Colonel Limbriti stoutly advocated union with Greece and declared that this programme must be maintained at all sacrifices.

THE CAMPAIGN IN EPIRUS.

The disastrous close of Col. Manos's advance into Epirus has been graphically described by the correspondent of the *Daily News*. On Wednesday, April 28, the Turks attacked the Greek position at Pentepigadia, on a tabletopped hill facing Janina, in force, but were repulsed after a good deal of fighting. Supported by the guns some 4000 men made several attempts to carry the crest by storm. Each time they were driven back, the Greeks working well and behaving splendidly. They numbered on the crest 600 Evzones and 400 others, with two guns, and on the central hill 600 Evzones, with two guns.

"Thus it is obvious," says the correspondent, "that we required reinforcements, as the Turks were very determined in their assault. I may note that it would have been perfectly easy to send strong reinforcements, as between Hanopoulo, at the entrance of the pass, and the advanced post, a seven hours' march, the Greeks had 6500 men and about 30 guns. Yet no support was sent. The force nearest to the point of attack was 3000 men with six guns stationed at Koumazades, four hours distant. There were also sections of two mountain batteries,

which were never brought into action, strongly placed at a point near Karvassaras, half an hour from the scene of the fight."

On Thursday morning the firing began soon after dawn as usual. Throughout the morning it continued desultorily, occasionally increasing and waning in volume without apparent result. "In the afternoon the fire was brisker, and the Turks were evidently preparing for a serious attack. We could see them gathering in loose groups of 20 and 30 men, taking every advantage of the ample cover of brushwood and oak scrub. They made at this time comparatively slight response to the increasingly heavy fire of the Evzones on the crest, where our guns for some reason unknown were now silent. Then for a while there was a lull, broken only by occasional shots from the central hill guns at the Turks, who gathered thickly opposite and were massing in a small village on our right front. Our guns on the crest were still silent, though their services were much needed. I do not know what time they were withdrawn, but they were not again fired during the day. Suddenly at half-past three there was heavy firing again. The Turks' fire, which was easily distinguishable from ours by reason of the sharper crack of the Martini-Henry, was much hotter than heretofore, and developing in the space of a quarter of an hour to the most terrific roar of musketry I have ever heard in any battle. This withering fusillade was maintained for three-quarters of an hour, the Turks meanwhile massing on the slopes on our right front, preparatory to rushing up the hill through the thick cover. Yet our guns on the central hill were silent, and after 20 minutes were hurriedly withdrawn. As a matter of fact they were being romped back to Hanopoulo as fast as mules could take them. The Evzones on the crest made a gallant reply to the murderous Turkish fire, but what could they do against ten times their number of rifles? They held out manfully, losing 100 men, till five o'clock, when cheers and bugle calls began to mingle with the roar of the Martinis. A moment later the Evzones came tumbling over the crest, firing as they came, the Turks after them, firing incessantly as the kilted men hurried down the rugged hill side. The position was taken. Nothing remained for us on the central hill but to make good our retreat while it was possible. The Turks on the crest began to pour a smart fire into us, to which our Evzones eagerly responded, but this was obviously useless. Some one gave an order, and the Evzones leaving their positions with a groan of disgust began to move sullenly away in the most orderly retreat. These men, like their comrades on the crest, had behaved perfectly throughout. As we approached Koumuzades we noted that the country side was dotted with groups of Greek soldiers, who had quitted their various posts on the hills, trudging down towards Hanopoulo. These men had received no orders, and admitted they had left their posts simply because they could not stay. At Koumuzades we found an entire regiment of 3000 men just getting on the move. The battery of guns had already gone. We formed the rear guard. We had a weird ride. We were car-

rying babies, and surrounded by a growing crowd of peasant refugees appealing to us for aid. The mountain paths were horrible in the darkness. About midnight we caught up with the tail of the flying army near Hanopoulo, and were chiefly and most unfavorably impressed with the quiet orderliness of the rout. There was no great hurry or seeming great panic, but everyone seemed determined firmly and quietly not to meet the enemy. Philippiada and other plain villages were ablaze. When we reached Hanopoulo we found Col. Botzaris helpless, surrounded by many officers equally helpless, for nothing would arrest the stolid progress of the great mass of men steadily trudging towards the bridge. It was the most lamentable sight I ever witnessed. As we went on we found the roads blocked by thousands upon thousands of sheep and cattle, and by all the peasantry of the country side—so rapidly does a panic spread. We found the Arta bridge blocked by the crossing of the artillery. We had a long wait, but at length reached the town, which was all astir and panic-stricken at three in the morning. Out of Arta burdened country folk were streaming just as on the morning of the declaration of war. Indeed, we are now back in the position we then occupied, but with all our prestige gone." A second Greek invasion of Epirus was reported in Athens, but it seems to have had its origin in lively journalistic imagination, and it is unlikely that any further step will be willingly taken by the Greeks until the arrival of Col. Vassos.

THE FIGHTING AT VELESTINO.

There has been long-continued fighting at Velestino. .The importance of the position held by the Greeks is great. It is the junction of the railway lines connecting Larissa, Trikhala, and Volo, and commands the only road over the mountains between the Plain of Thessaly and the sea. Its strategic value is increased by the fact that it at the same time defends the chief line of retreat to Volo and the Piræus, and the place being upon the Phersala-Volo line offered many advantages for defense. These the Greeks took full advantage of, but the Turkish attack was finally in overwhelming force, and the retirement of the Crown Prince on Domoko, makes Col. Smolenski's hasty retreat from Velestino imperative.

A Turkish force, consisting of about 1000 cavalry with six field-guns, made a reconnaissance on April 27 in the neighborhood of Velestino, but failed to cut the railway after fighting for an hour and a half with a Greek force of 450 men with six guns. The Greeks were reinforced after the fight from Phersala.

Another reconnaissance was made at 6 P. M. on Thursday, April 29, by the Turks, who numbered about 5000 infantry, with a regiment of cavalry and 12 guns. The Greeks were in considerably greater numbers. The Turkish infantry reached some trees close to the railway, but again failed to cut the line, and retired after two hours' fighting.

Further fighting occurred on the next day, Friday, April 30, begin-

ning at four in the morning and lasting 12 hours. The Turks numbered about 8000 of all arms, the Greeks more. The Turks attempted to turn the Greek position by moving round the lake. On the left the Greeks more than held their own. The centre was comparatively inactive, while on the right the Turks forced their way up the hill. The losses in this engagement were heavy on both sides. The Turks by a splendid bayonet charge took Kephalo, though they were greatly inferior in numbers to the enemy, but retired from Velestino at night, the Greek position being evidently too strong. They sent forward two squadrons of cavalry to attempt to capture the Greek left battery, which reserved its fire till it was well within range, and then repulsed them with slaughter. Many dead men and horses were still lying on the battle-field next morning, together with several wounded. The Greek losses are given as 20 killed and 85 wounded.

On Wednesday last the battle was again renewed, an attack in great force being made by the Turks. There was stubborn fighting, and the Turks are said to have lost severely, but Col. Smolenski's position had become untenable through the general strategic advance of the Turks upon the whole of the Greek positions. He, therefore, fell back. The position is critical. The sea base at Volo, admitting of retirement to the Piræus, lies on one hand and Almyro is in the rear, but it is doubtful, in face of resolute action on the part of Edhem Pasha, whether by taking this route Col. Smolenski would be able to unite his forces with those of the Crown Prince.

THE FIGHTING AT PHERSALA.

Last Wednesday the Greeks were attacked in a strong position north of Phersala, Edhem Pasha advancing about 50,000 men against 20,000 Greeks. The engagement began with preparations for the attack by the guns, and before long the Greeks, leaving their first position, fell back behind a stream which ran between their position and the village. There was heavy firing during their passage by the bridge, and on both sides the men fought with splendid courage. But the result was not doubtful, and the Turks advanced gleefully, confident of victory. An attempt was made to outflank the Greeks on the right and cut off their retreat to Domoko, but in this they were unsuccessful. It seems likely that the Crown Prince had already made his dispositions for retirement, and although there was stubborn fighting throughout the day, in which the Prince himself took part, it appears to have been for the purpose of covering the backward movement. It is very evident that the Greeks are both outnumbered and outgeneralled.

A FRENCH VIEW.

The Paris *Journal* publishes a telegram, dated May 2, from its special correspondent at Volo: "I passed the day yesterday with the staff visiting the battle-field. Col. Smolenski's tactics were simply perfect. His

8000 men not only defeated 9000 Turks, but forced them to retreat hurriedly on Larissa. I saw many dead left on the field, the cavalry especially having suffered severely. By Col. Smolenski's orders the Greeks allowed the Turks to approach in their furious charges to within 200 yards before opening fire. The bravery of the Turks was truly admirable. The neighborhood of Velestino is now completely cleared of the enemy. The train service has been resumed and two battalions of reinforcements have arrived, so that there are now 30,000 men at Phersala and 10,000 at Velestino. Col. Smolenski would have liked to execute a forward march in conjunction with the Diadogne's army, but this appears to be impossible. In any case his prestige with the soldiers has been immensely increased by late events. He alone is able to reëstablish the morale of the troops, but even he will have to hurry, otherwise fatigue will complete their demoralization. The troops are admirably brave, but marches, counter-marches, and privations are wearying them out worse than battles. The panic at Volo ceased with the arrival of the foreign and Greek warships, but the town, like all Thessaly, is being abandoned, the population taking refuge at Eubæa and Athens, where the numbers of the destitute are daily increasing. M. Tranados, Minister of War, and M. Theotoki, Minister of the Interior, have arrived at Volo, but leave at once to take part in a general council of war in connection with the battle which is expected to take place to-morrow."

At the beginning of the week, May 9, the collapse of Greece was complete, and the intervention of the Powers made certain the approach of peace. The Greek fiasco is pitiable. Everywhere, save that some individual bodies of troops have shown sign of gallantry, they have fled in abject panic at the coming of the victorious Turk. Without any great ability in the command, deprived of supplies, disorganized, wanting confidence between officers and men, imperfectly trained, and destitute of discipline and *esprit de corps*, the Greek army has shown once again that a collection of men, even of groups of soldiers, do not make an army, and that a rotten military system is a national peril. The defeat at Phersala and the retirement on Domoko determined the retreat of Col. Smolenski's division, which had shown useless gallantry at Velestino, and it fell back, lest it should be entrapped, on Almyro, and further in the direction of Sourpi. At the time of writing its exact position is unknown. The surrender of Volo inevitably followed, and an account of how this was brought about will be found below. As before, Edhem Pasha did not immediately follow up his success, but set himself to prepare for decisive action against the Crown Prince's army at Domoko, which is in no condition to offer effective resistance.

This desperate situation of affairs has worked a great change in Athens, where the news that Col. Vassos and the Greek forces in Crete were to be withdrawn from the island provoked scarcely a murmur, and the desire for peace has now become unmistakable. By its decision to recall the troops from Crete the government showed its willingness to

conform to the desires of the Powers, and the *note verbale* by which it signified its decision to the Legations of the Powers was practically an appeal for intervention. It has been informally notified to the government that until this step was taken there could be no hope of obtaining the mediation of the Powers. The intervention of the Powers with the view of securing an armistice is now an accomplished fact, and collective notes have been delivered both in Athens and Constantinople. The Hellenic government has left its interests in the hands of the Powers, and the note to Turkey requests a cessation of hostilities. The demands of the Porte are not known, but they will include an indemnity, with guarantees for its payment, some rectification, it is believed, of the frontier, probably other advantages, and, it is alleged, the cession of the Greek ironclad fleet.

THE SURRENDER OF VOLO.

The retreat of the Greeks caused a fresh panic in Volo, and when it became known that Edhem Pasha was making his dispositions to take the place the civil officials seem to have become demoralized, and in the dire strait the British and foreign consuls, with certain newspaper correspondents, undertook to approach the Turkish commander. The *Daily Mail* correspondent thus describes what he saw:—

"To-day, May 8, at 10 in the morning I was looking about the station at Velestino for water when suddenly I saw a Union Jack. I ran towards the flag, and met the *Daily Mail* correspondent with the Greeks, Mr. Reid, Mr. Villiers, and two other correspondents, with the English and French consuls, and two English, two French, and two Italian sailors in two carriages. They had come with a flag of truce to arrange conditions for the surrender of Volo. Immediately Nedjib Bey, the Sultan's aide-de-camp, went to them in a carriage. I followed on horseback. I heard from Mr. Reid the amazing story of the panic at Volo, which has now lasted a fortnight. The British consulate has been besieged and almost demolished by a maddened crowd seeking protection. So bad were things that the English correspondents insisted on being recognized as police for the protection of the consulate. Then came the second battle of Velestino. The panic at Volo was terrible. The people crowded round the Europeans in the streets, seizing holding of their clothes and begging protection. The military authorities had fled; the civil authoritie were dying of fear. So the British consul, Mr. Martin, whose conduct is above all praise, with the French consul and the correspondents decided to go to Velestino and arrange an informal capitulation. At Volo were two sloops, an armed transport and the warship *Psara*, but the Greek admiral promised to leave. The deputation left Velestino at midnight, and went slowly so as not to reach the Turkish outposts before daybreak. Nedjib Bey went with the consuls. On reaching Volo at eight o'clock the consuls saw that the *Psara* had not left. However, it was decided to enter the town. A procession was formed, with Nedjib

Bey between Mr. Reid, who carried the flag of truce, and a small officer with the Union Jack. Besides this were the flags of France, Russia, and Italy. In the second line were myself and Reuter's correspondent. The entry into Volo was a triumphal one. The inhabitants drew up in black masses on each side of the road. They followed behind us—many of them putting on the fez. One gave himself away by wearing a fez which no Turk had made. We reached the town hall and entered. Nedjid read to the mayor Edhem's proclamation announcing that Volo was under the Turkish flag, and promising the Sultan's protection; there should be no violence, outrage, or pillage for the peaceable inhabitants, but severe punishment for plunderers and bandits. When this had been signed all went out on the balcony, where the proclamation was translated into Greek and read to the crowd below, which greeted it with enthusiastic cheers for the Sultan, and signs of general relief."

The Greek ships subsequently left, and Volo has since been peaceful. The *Dryad* arrived from Constantinople.

AT DOMOKO.

Notwithstanding the wholly ineffective condition of the Greek army, the Crown Prince issued on Monday, May 10, the following order of the day, which deserves to be preserved:—"Soldiers of the Greek army! The army has retired on Domoko because our positions at Phersala were not strong enough and the enemy was greatly superior in numbers; but the positions which you occupy here are so strong that our army may be considered invincible, and I am confident that you will be able not only to repulse with success every attack of the enemy, even though he is superior in numbers, but that you will be able shortly to take the offensive and compel him to abandon Greek territory. Remember that here you defend the sacred soil of the Fatherland and the honor of the king and nation, and that the enemy must not be allowed to make a further step in Greece. I know very well that you have suffered and are suffering from many privations, after having been obliged to fight for so many days, but we must endure these privations with patience in the confidence that we are doing our duty to the Fatherland.—CONSTANTINOS."

The following appears to be the situation at Domoko, where Edhem Pasha has made dispositions to attack. The Turkish right, with its base at Karaclar, occupies the villages of Phitia, Asmalar and Aslanar. The Greeks hold the road in front of these important posts with 2000 infantry and artillery. Two other roads near Mosle and Verezotes are strongly defended. The Turkish left lies slightly in front and on either side of the Kasidiari mountains, and the Greeks face them at Tsialma Kisla and Kitiki. The first-named is the weakest point, and is held by 4000 or 5000 troops, mainly consisting of the 4th Regiment. No attack is expected on the centre, but the position of Domoko invites an effort to take it in the rear, and if the Turks have, as is believed, 60,000 men there, they will, unless an armistice should be concluded, doubtless make such

an attempt after some preliminary feints. The attack, if successful, would lead to a complete collapse of the Greek army. But no one now expects actual fighting round the town.

Hostilities between Greece and Turkey having been closed by an armistice of 17 days, the future remains with the Powers, in whose hands deluded Greece has left her case. The terms demanded by Turkey were felt in all the capitals of Europe to be inadmissible. Brigandage upon the Thessalian frontier may have been a danger and trouble to Turkey, and certainly the Greek bands which, by crossing the frontier provoked the outbreak of hostilities, had had many predatory predecessors; but Europe, nevertheless, is not disposed to see Thessaly handed back to Ottoman rule. Nor is it to be supposed that the capitulations which protect Greeks resident in Turkey will be permitted to be abolished. Moreover, it is not easy to see how Greece, already almost bankrupt, is to pay the indemnity of £T10,000,000. On the other hand, Turkey undoubtedly has preponderating rights, and cannot be deprived of a large fruit of victory. The situation was complicated by the useless and ill-advised attempt made by the Greeks last week to snatch a victory in Epirus, but the instances of the Powers, with whom Germany has fallen into line, and a personal appeal from the Czar to the Sultan, have brought about a cessation of hostilities.

THE FIGHTING IN EPIRUS.

The resumption of hostilities in Epirus seems to have been due to the initiative of Col. Manos, who was anxious to recover the prestige of his army. The government, to which he communicated his plan of action, regarded it as extremely hazardous, but sanctioned an advance, the general plan being that Col. Bairaktari should occupy defensive positions protecting Arta, while Col. Golphinopoulos advanced towards Chalclades and the banks of the Luros with the object of coöperating with the band of Epirote volunteers under Col. Botzari advancing from the south. The forces under Cols. Golphinopoulos and Botzari were to meet near the bridge over the Luros and, if possible, proceed to Zalongo and Camarina for the purpose of giving a safe conduct to Arta to the numerous refugees congregated at those places. An advance upon the Turkish positions was made on Thursday, May 13, the Greeks displaying great coolness and bravery. At the close of the action they had gained advantages and were filled with enthusiasm. Col. Bairaktari's brigade, however, attacked a strong Turkish position at Gribovo on the next day with great impetuosity, the combat for some time being maintained at close quarters, but owing to the obstinate defense of the Turks it became necessary for Col. Golphinopoulos's brigade to proceed to its support. The original plan of operations was consequently abandoned. The efforts to dislodge the Turks at Gribovo failed, and both brigades retreated to Arta.

The losses of the Greek army at the battle of Gribovo were the

heaviest which it has sustained since the beginning of the war. Upwards of 500 men were placed *hors de combat*. Seven officers were killed and 31 wounded. The opposition journals severely censured the government and accused it of wantonly sanctioning unnecessary bloodshed. Colonel Manos and the chief of his staff were immediately superseded.

THE BATTLE AT DOMOKO.

The fighting at Domoko on Monday, the 17th, was the fiercest of the campaign, both sides displaying stubborn courage. The attack began shortly after noon. The Turkish artillery, after some experimental firing for the purpose of finding the range, opened a hot cannonade. Subsequently the attack was developed against both flanks of the Greek army, an advance being first made against the western wing by way of Kato Agoneni, Veleriotes, and Skarmitza. Here, however, the Greeks held their positions; Col. Mavromichaeli, in command, was wounded. The Turks then pushed forward two columns against the right or eastern wing, occupying Karatzoli, driving back Colonel Mastrapas, and afterwards advancing to Vousi. It appears that Edhem Pasha concentrated an overwhelming force on this side, apparently with the object of cutting off Col. Smolenski's brigade from Sourpi. At 2.30 P. M. the Greek front was attacked with a vigorous artillery fire, for 12 batteries were advanced within 600 metres of the Greek position. The success of the Turks in driving back the right wing had, however, rendered the position of the Crown Prince at Domoko untenable, and the order to retreat towards the passes of Mount Othrys was given at three o'clock on Tuesday morning. The retreat was carried out in fair order, and nearly all the artillery was brought away except some heavy guns which were left at the Akropolis of Domoko, and a considerable amount of war material was left behind. The Greek army fell back to the three passes of Karya, Phourka, and Yannitzo, and an armed band was sent to its support from Lamia. Col. Smolenski's brigade also retired. The brigade occupied positions extending from Kephalosis, on the coast, to Baklili, the Greek fleet being anchored in the bay of Mizeli. The government allowed Col. Smolenski the option of embarking his troops or of proceeding overland to Stylis and Lamia. No serious attack was made on his position, the Turks confining themselves to a mere demonstration and avoiding the fire of the fleet. They followed up their victory at Domoko, however, attacked the Greek army on Tuesday at Phourka and other positions on Mount Othrys, and compelled it to retreat towards Mount Oeta and Thermopylæ. The 4th regiment of infantry was driven from its position at Antinitsa, the retreat of the main force being thus threatened. Before further hostilities could take place, however, news of the cessation of hostilities, was received both at Domoko and Arta, and in Athens, where the greatest excitement prevailed, the public mind was calmed.

Military Notes.

THE GRÆCO-TURKISH WAR.

THE telegrams received up to the moment of writing all indicate the dissolution of the Greek army, and the written despatches from both armies published during the week confirm the views put forward in our last issue. There was no "battle" near Turnavo, there has been no "battle" at Velestino—only a series of outpost engagements designed by the Turkish staff to mislead the enemy and to hold him tightly in hand whilst the real danger was being prepared elsewhere. The Greek telegrams reveal how completely successful the Turkish tactics have proved. "The railway (?) communications between Phersala and Velestino still open"; "The great natural strength of the Greek position and the power of moving troops by rail to either flank," etc., all point, not to the influence of the press censorship but to the want of military training of the despatcher, revealing him or them as men mistaking names for things, and incapable of distinguishing between a Greek mountain railway with Greek staff, and the Midland or Great Northern main line service with north country staff. Even as we write these words additional confirmation comes to us in the shape of telegrams announcing that "Railway communication between Phersala and Velestino is interrupted. Turkish shells are falling in Phersala, and Colonel Smolenski at Velestino has been left free to choose his own line of retreat." Practically speaking this finishes the matter. Unless the Turks see fit to build a golden, or at least silver-gilt, bridge for their foes, the last organized Greek army is doomed to utter destruction, and no power on earth can save it. The slightest threat towards Domoko will suffice and then the business is over.

The strategical teachings of a campaign can never be accurately arrived at until the secrets of the various archives are disclosed; all previous criticism is and can only be speculative, but in this instance the evidence in favor of one particular conclusion seems to be quite overwhelming. The Turks have revived the ancient game of "strategy," using the word in its eighteenth-century signification, and in so doing they have proved themselves the master of those who so very recently migrated to the Golden Horn to teach the "art of war" as "made in Germany." They have been able to do so because they possess a fighting stock of recruits in which is deeply engrained the fundamental spirit of a true soldier's being, viz., as Scharnhorst put it, the knowledge "how to die," not "how to avoid dying." This spirit was common to

all long-service armies in pre-revolutionary days, but it has never really taken root in the three-year or two-year conscripts of our own day, and as a consequence there has not been, and there probably is not now on the continent of Europe, a leader who would dare, as Edhem Pasha has dared again and again, to risk his reputation on the possibility of withdrawing an advanced guard from an engagement of the serious dimensions to which these Turkish "demonstrations" have generally attained.

Compare Von der Goltz's own comments on the advance-guard actions of the 1870 war, and indeed the tone of the whole German military press on the subject, and particularly with reference to the battles of Woerth, Spicheren, Borny, and Vionville. Whoever it might be—Crown Prince, corps, or divisional commander—none dare call off his troops when once they were fairly "set." The short range of the German needle gun may fairly be cited in extenuation; the curious thing is that no German writer has ever thought of adopting this course, neither has any friendly English critic. The truth of the matter really is that both French, German, and English critics alike have written of Western troops as products of the nineteenth century and its special surroundings, and have not realized that both in Russia and Turkey forces exist who care for none of our refinements, but who will fight and die for their country when and where their officers please, and not where they, the individual fighters, may happen to prefer; and it is curious, too, to note how the same idea has persisted in India, in spite of all promotion examinations, etc., amongst the men who lead our Sikhs and Goorkhas.

It is not difficult to see why these things should be. Von der Goltz himself, writing about 1883, before his mission to Turkey, indicates the cause exactly as it applies to all Western nations in proportion as they may have more or less closely copied the German model. Briefly it may be put thus: The more strictly the localization of regiments is carried out, and the greater the stream of news from the front, the more the losses of a particular regiment in a particular encounter falls like a blow on the district concerned. To call off a regiment once hotly engaged, or leave it to its fate once it had served its purpose, would raise a cry against the man who did it which few would be strong enough to face, unless they had previously cut the wires behind them; and yet it might well happen that the lives thus apparently thrown away might repay their fighting value ten times over before the end of the campaign. This is merely a suggestion thrown out for our readers to think over, but it is curious to note how many of the Oriental races who still possess this grit and quality are ready and willing to follow our leaders; and in face of the coalitions by which from time to time we are threatened it is at least soothing to contemplate the hordes of brave men whose services, thanks to our "sea power," we may yet command.—*Army and Navy Gazette.*

Compared with 1866, with 1870, and with 1877, the Græco-Turkish

war is of small account. Yet it has, for the general reader as well as for the military student, an interest above its merits.

The general reader who has read of the power of the machine gun and the magazine rifle expects a carnage awful and unprecedented, and owns reluctantly to a sense of disappointed prophecy when he learns that the death-rate so far is less than in previous wars. He has ignored the fact that the improvement in weapons tends to reduce, not to increase, the percentage of loss in contending armies. The military student is anxious to see how his pre-conceived notions of the destructive effect of the shrapnel fire of modern artillery, the use and abuse of cavalry, and the methods of a modern infantry attack, bear the test of practice after twenty years of theory. The events chronicled are so recent that a detailed review of the course of the campaign in Thessaly would seem unnecessary, and a few notes on some of the various points of interest which have arisen will occupy fully the space allotted to this article.

The Turks lay to the north, the Greeks to the south, of the range of mountains which is pierced by the Maluna Pass—the Turks in superior numbers. There were troops of each force to the right of this pass, and troops of each force to the left; some of them miles away from the decisive point, which was the nearest road from capital to capital.

The struggle at the Maluna Pass, which began on the 17th April, involved (as did Suleiman's attack on the Schipka in 1877) a direct assault on a mountain stronghold, and resulting in favor of the attacking Turks principally by the effect of their artillery fire, though, strange to say, the actual destruction caused by this fire is reported to have been very small. The battle was continued in the plain day by day till Turnavo fell, and the feature of these days' fighting would seem to have been the small proportionate loss of the men engaged, the long range at which the infantry fire was opened and continued, and the gradual assertion of the Turkish predominance in artillery.

By the evening of the 23d April the Turks had established themselves within striking distance of the Greek position, and a trivial cavalry movement of theirs in the dead of night caused that panic and flight of their enemy's troops which will render the name of Larissa famous for years to come. Worn out with the prolonged strain of several days' fighting, unfortified by the stimulus of an iron discipline, mixed with the unarmed civil population, and, worse than that, with the armed but undisciplined "Associations of Patriots," the Greek army broke and fled. The incident is valuable reading for those who rely on enthusiasm to take the place of ingrained discipline, and improvised efforts the place of a complete training in time of peace.

The Greek army rallied creditably after its period of disorganization, and took up a faulty position, its left on Pharsala and its right on Velestino, its extreme right being at Volo. The latter place, it must be remembered, was that at which the troops were landed when sent from

Athens, as the passage by water was easier than the passage over the mountainous region between the capital and the frontier. So that the retreat of the main force on Pharsala necessitated a widened gap between this part of the army and its base of supplies. Further, the result of this retreat on Pharsala was to give up the water route as a line of retreat, and compel the Greek force to rely on the mountain roads, with their scanty means of subsistence.

The railway which connects Volo with Pharsala and Trikhala, branches at Velestino to Larissa. Hence the importance of Velestino. The Turks, once established there, could use the railway as a means of supply for their troops, and they thereby could cut off the Greeks at Pharsala or its neighborhood from their sea-base at Volo, and compel them to trust to a risky retreat by a mountainous and ill-supplied route. This all-important junction nearly fell at once into Turkish hands. A cavalry reconnaissance almost carried it by a *coup-de-main*, the advance of the cavalry from Tel-el-Kebir to Cairo was nearly repeated, and the venture probably failed for the want of a handful of quick-moving infantry. What would that cavalry leader have given for a battalion of our mounted infantry! The Greeks repulsed this cavalry attack, recognized the value of the place and strengthened it, and its capture cost the Turkish army dear.

The Greek commander, relying, probably, on the line of railway, which connected his two wings, appears to have committed a common kriegsspiel error in extending his troops over a space of country too extensive for proper occupation. The result was that he was strong nowhere. On the 5th May the Turks attacked both extremities, penetrated in the centre, and the loss of Pharsala brought about the loss of Velestino. During the night the Greeks fell back and took up a strong position at Domoki, about twelve miles to the south of Pharsala. A concentration of the whole force near Velestino might have delayed, if it could not have averted, the final collapse.

One incident in the attack on Velestino will redound to the credit of all concerned. A fresh battery of artillery was causing loss and annoyance to the advancing Turks. A body of Circassian cavalry, led by the son of an old Turkish warrior of Armenian fame, fired by the highest traditions of cavalry leadership, moved forward to the attack of the guns; the charge was ridden nearly home, when the infantry escort to the guns admirably placed and concealed opened a convergent and overwhelming fire, and the gallant Circassians fell back with a loss of men and horses, leaving the battery intact, but with the satisfaction of having maintained the highest traditions of the cavalry arm.

Those who have studied the Russo-Turkish War of 1877–78 were by no means astonished to hear on the morning of the 1st May that the hitherto successful Edhem Pasha had been superseded. The changes in the commands, in the former war, and the constant interference in the military plans telegraphed from Constantinople had a most baneful effect on the fortunes of the Turkish army. And it looked as if a similar su-

persession of commanders was to be initiated in this case. Luckily the success of Edhem before Larissa came in the nick of time, and the continuity of command was maintained. The Turks are not the only people who have complained from home of the slow movement of their armies in the field; but surely this time there was little enough cause for impatience.

Given their superiority in numbers, the Turks have had a difficult task; and the order and regularity of their advance, their application of "Superior force at decisive points," their triumph over the difficulties of supply down a long and mountainous line of communications deserve all praise.

No less is their moderation in success worthy of admiration—it was not always so in the Russo-Turkish War; but in this campaign their behavior has apparently rivalled the most "moderate" army of modern times, the Germans of 1870–71.

To the fighting value of the Turkish soldiers the following passage written twenty years ago by an Englishman, a master of the art of war who knew them well, bears ample testimony. It is as true to-day as then, and in it lies the main reason of the Turkish success—in the converse qualities the main reason of the suddenness of the Greek failure.

"The trained Turkish soldier seemed to possess every military virtue. Patient and enduring, submissive to discipline, of strong physique, and a good marcher, cool and brave in moments of danger, and possessing to a high degree that military instinct which is so valuable in the loose formations demanded by modern warfare, the Turk forms the beau-ideal of a soldier."—*Journal R. U. S. I.*

ARTILLERY ORGANIZATION.

In a recent article contributed to the Indian *Pioneer*, expressing disappointment at the postponement of the long-expected scheme of artillery organization, the writer censures everyone in general, and this journal in particular, for the delay which has occurred in carrying out his views of what should be done in settlement of this important question. We can assure our candid critic that if this "antiquated journal" were to "range itself," as he suggests, on the side of every crude and ill-considered scheme of so-called reformers we should soon lose the confidence of our readers, and deserve the epithets which the *Pioneer* heaps on our heads with so little regard to the circumstances which render delay in this particular instance not only desirable but necessary. The British army, like the British constitution, is a plant of slow, complex, and delicate growth, and while its course should be marked by continuous progress, organic changes should never be introduced without careful consideration. Moreover, when change is determined on it should be based on definitely conceived principles reconcilable with the general requirements of Imperial defense, and not with mere limited thought for the department immediately concerned. Anyone can criticise and fill columns

of a newspaper with smart and aimless censure of everything. If we are to be pronounced "antiquated" because we do not do this we prefer to be "antiquated," but we hope sound in our views.

Let us take this case of artillery organization as an illustration of our meaning. The late Commander-in-chief was opposed to organic change, but in favor of internal administrative improvement. The present Commander-in-chief was at one time—though he is now reported to have modified his views—an advocate of more decided measures of reorganization than his predecessor. Again, Lord Roberts, the senior artillery officer on the Active List, is known to be on the side of administrative rather than of organic reform. Clearly under the five years' rule, in regard to this and other questions, if each Commander-in-chief were to insist on carrying out his own individual opinions without consideration for the views of those round him, there would be no sort of continuity of War Office policy and the army would be in a state of incessant restlessness, which would interfere with what is far more important than organic changes of system, viz., the steady, progressive training of our troops for war service. Doubtless this consideration has been the guiding influence with Lord Wolseley in refusing this year to take a step which further reflection may show to be a leap in the dark.

As regards this question of artillery organization our views have been sufficiently stated from time to time, and there is little to add in justification of an attitude which has been consistent and logical throughout. Ten years ago the garrison artillery, owing to mismanagement, had been allowed to sink into a condition of such lamentable inefficiency that, in common with many others, we thought the only solution was to place it on its own feet as a separate corps. The report of Lord Harris's committee, however, showed that there were serious objections to this course, and advised the trial of certain administrative changes which have been carried into effect with excellent results. The garrison artillery of the present day has, after ten years of good work and sound administration, recovered its lost prestige, and it now holds a position under altered conditions of scientific development not less honorable than it did at the close of the Russian war. We have no hesitation in saying that our maritime fortresses are in a far more efficient state than are those on the coasts of France and Germany. The officers are now kept sufficiently long at their work to enable them before returning to their field duties to grasp all that is necessary to know to insure the efficient fighting of these coast forts in the very improbable event of their being attacked. This being so, we have recently questioned the wisdom of making a drastic change which is strongly opposed by nearly all the highest artillery authorities in the service, among whom may be mentioned Lord Roberts, Sir Robert Biddulph, and Sir John Adye. Our view is that such a change is no longer necessary even regarded from the narrow standpoint of departmental efficiency, and that the Secretary of State would do well to stay his hand and encourage the development of the

present system which insures the security of our naval bases and coaling stations, while it insists on the majority of those officers who are detailed for fortress duties being likewise trained for field work in case the necessities of war should require their services.

The real determining factor of this question is the rapid growth of the navy during the past decade. While there has been a tendency in some quarters to exaggerate the power of the navy for purposes of defense to the detriment of necessary military preparations on shore, none the less, if the efforts recently made are continued on the same scale, the possibilities of our maritime fortresses ever being attacked are year by year growing more remote. This does not justify those who advocate the demolition and disarmament of all forts on shore. The protection by fixed fortifications of naval bases and coaling stations is a prudent and necessary part of the policy of Imperial defense. But a limit must be placed to the time, money, and energy devoted to coast defenses, which are likely to play so insignificant a part in future warfare. Above all we should never consent to practically demobilize half our fine force of artillery by locking it up in forts where its fighting utility will be lost to the country. It is satisfactory to learn that these views have recently impressed themselves on the authorities, and the expected scheme of reorganization has been postponed for the time being and until its necessity becomes clearer than is now the case. The great need of the present day is to increase the mobile power of the army so as to enable it to coöperate with the navy wherever danger presents itself, remembering always that such preparations are the best guarantee for safety, whether at home or in our Imperial possessions abroad.—*The Army and Navy Gazette.*

GARRISON GUNNERY.

Now that there are proposals to constitute the garrison gunners a separate and distinct branch of the Royal Regiment of Artillery it is probable that they will gradually work out some reforms and improvements which the more zealous members of their service deem necessary to efficiency. Writers on garrison gunnery have long endeavored to convey to the public an idea of the enormous forces, the complicated machinery, and the numerous scientific appliances with which a good coast gunner should be familiar. It is not, however, so generally understood that rapidity of decision and movement is quite as necessary in this as in any other branch of the artillery service. Accurate calculation is, of course, essential, but smart execution is not less so, because no other branch has to deal with such quickly-moving targets. This is forcibly stated by Major-General J. B. Richardson, R. A., who says: "The fastest target on which field artillery are likely to practice is cavalry in motion, say, at ten to twelve miles an hour, but a ship moving at eighteen knots, or a destroyer at twenty-five, are targets racing at twenty and twenty-eight English miles." The same writer asserts that notwithstanding the para-

mount need of arrangements for rapidity of fire, they are wanting in the coast artillery. These are suitably-designed emplacements; suitable sights; better loading, traversing, and elevating gear; improved communication and ammunition supply; the proper training of men at quick targets, and their instruction in the capabilities of ships. The question arises here whether the coast artilleryman is permitted to exercise sufficient influence on these arrangements. On some of them he certainly has his say, but not on others. The Royal Engineers and the manufacturing departments do their best for him, but the pace at which vessels can now get into and out of range demands extremely alert and quick work, for which his present surroundings are unsuited. While, therefore, it is undesirable to burden him with the duties of construction and manufacture, he should be freely consulted, as he must know his own requirements better than anybody else can do. Unless these requirements are properly met it will be impossible for coast artillery to attain any high standard of efficiency. The shooting of the navy is quicker than that of the artillery with the same nature of guns, but there is no good reason why it should continue to be so, and there surely should be a "strong pull altogether" by those who have to do with our coast defenses to bring in the improvements mentioned above. One of these, namely, "training at quick targets," should be considered indispensable. As General Richardson remarks: "It is next to impossible to make officers and men realize the necessity of extreme speed of fire when a target remains for hours in range, when they know that the tug supplied cannot, even without a target, slip away in a hurry out of the gun arc, and when it cannot move reasonably quickly out of foul range into fair open water. Very fast targets would almost by themselves teach rapidity of fire and give the necessary amount of coolness and nerve." Quick practice necessarily implies perfect training on the part of the gunners, but that is to be taken for granted in the gun detachments of the Royal Artillery, and it will doubtless be found that when their surroundings are in keeping with their duties, and when they are allowed a reasonable freedom of action they will be as great a credit to the army of the future as they have been to that of the past.—*Army and Navy Gazette.*

THE UNITED STATES AND CUBA.

The Monroe doctrine pushed to its uttermost limit, must needs give reason for serious reflection in this or, indeed, in any European country with possessions in America. The question of international law, or rather the lack of its observance, which a large portion of the United States press apparently heedlessly raises on this rash resolution, does not apply to Spain alone. As to how colonies of European powers in, geographically speaking, American limits are governed or administered it does not become us to consider, and our well-known sympathy with our cousins across the Atlantic makes us chary in condemning them in any matter. But we must be careful not to allow the theory that the

Government of the United States has a title to interfere between a European mother country and a colony which existed before the United States were thought of as a government to pass unchallenged. Without raising invidious comparisons we cannot place ourselves in the position of a strong man who can see a passer-by attacked without a demonstration in his favor. Such conduct will in all probability expose the cautious and not noble-minded spectator to become himself a prey later on. "L'appétit vient en mangeant."

How it can be possible for even a section of the people of the United States, with all its experience of the difficulties of the negro question, to wish to saddle itself with the administration of countries where the black race is largely represented passes human comprehension. But that a certain minority desirous of annexation to the States exists in all the large West Indian Islands, save Haïti, it is idle to deny. Besides which there are vast territories both north and south of the United States which do not contain any of the troublesome African race, and which doubtless would be very welcome to the American. Therefore the owners of those territories, even from the most selfish motives, are bound to protest against the interference of the United States of America between Spain and her rebellious colony.

The *Journal of Commerce*, after repeating its approval, gives its opinion as follows: "The Senate's procedure shows that national trials and dangers are without effect in restraining the spirit of irresponsible rashness." Most true, and the unpreparedness of the United States to enforce such views is patent to all. In Cuba, at this moment, Spain possesses an army of 200,000 troops of all sorts, exclusive of native volunteers; at home she has 128,000 men with the colors. So that, allowing for sick, desertions, and so forth, and giving 100,000 men as necessary to deal with the Cuban insurgents, Spain can actually oppose 100,000 seasoned troops to any American force which may attempt a landing in the island. The establishment of the American army is 25,000 men, which is rarely approached. It is true that a smaller establishment at the commencement of the secession was quickly raised to 186,000 in 1861, to 637,000 in 1862, and to over 1,000,000 in 1865; but those huge forces, themselves at first undisciplined, had to meet only brave undisciplined foes, which would not be the case at present, and the agonies of that struggle are not beyond the remembrance of those who are not yet old. So that were a war entered into now against Spain the position of the United States' land forces would be one of hopeless disparity. Nor is their sea power sufficiently strong to prevent an enterprising enemy at the gates, so to speak, of New Orleans attempting an occupation which would have an enormous moral effect. The ships of war of the United States number but seventy-four in all. Of these nineteen are merely coast-defense vessels and three torpedo-boats, and five are really powerful battle-ships. Spain, though she has only one battle-ship, possesses ninety cruisers of various classes, and it is doubtful if amongst them there are so many

obsolete vessels as exist in the United States Navy. Moreover, Spain has an excellent coaling station in Havana; the United States have not one in Carribean waters. So that, if not sentiments of justice and political honesty, at least those of self-interest ought to convince the most rash of Americans that any armed inteference in the Hispano-Cuban question is fraught with considerable peril to the Union.—*The Army and Navy Gazette.*

A NEW MAGAZINE POUCH.

A magazine pouch of an ingenious and entirely new description has been invented by Sir Hawtrey Cox, Bart., formerly captain in the Inniskilling Dragoons. The pouch holds fifty rounds of Lee-Metford ammunition, and will also hold blank rounds together with the empties if necessary. The pouch is circular in shape, diameter 7½ in., depth about 2 in. The action of taking out one round brings the next round into its place, where it is held firmly and cannot fall out of the pouch till required for use. There is a slide which covers the opening. The well-known army and naval contractors, Messrs. Griffiths and Browett, of Birmingham, have certified that the mechanism cannot get out of order, and even should it do so by any unforeseen chance it requires no skilled labor to set right, and can be rectified by any armorer-sergeant. Sketches and a description of the pouch will be found in the *Journal of the United Service Institute* for this month. The advantages claimed over the old pouch are: (1) That it will hold more rounds, the two pouches of an infantryman holding the whole number of rounds issued to him, viz., one hundred; (2) that the ammunition cannot be lost, each round being held firmly against the pouch by the action of a spring till required for use; (3) that the ammunition is always ready for use; (4) that the ammunition is better preserved from wet or grit; (5) marines and sailors will find the pouch most advantageous when clambering about ships or boats and in rough weather; (6) the pouch is superior to the bandolier in that it is easier to fill and not so clumsy on the body, thus giving free action, whilst it is easier to load from and get at, and preserves ammunition better from rough usage and weather. Sir Hawtrey Cox's idea would appear to have much to recommend it.—*Army and Navy Gazette.*

FIRE DISCIPLINE.

Capt. Stewart Murray, 2d Battalion Gordon Highlanders, delivered an able lecture at Aldershot upon the above all-important subject.

Capt. Murray said: Fire discipline starts from the experiences of 1870. In that war breech-loader fought against breech-loader for the first time, and it was found that its great range and rapidity of fire introduced certain new conditions into infantry fighting. In endeavoring to understand the object of fire disciplice we have to consider a style of fighting quite different from our small wars; the great difference consists in the fact that modern rifle fire at close ranges is so deadly that it

is necessary to break, that is to shoot, down the enemy's fire resistance before it is possible successfully to cross the last 500 yards. And if the enemy is under cover this takes a long time, often some hours, to accomplish. We have to consider such fighting as that in the frontal attacks of the 5th Corps at Woerth—108 guns, 9.30 to 10.30, practically silenced hostile artillery; at 10.30 20th Brigade seizes first parallel (high road, ditches, hop plantations) and hold on against French counter attacks; at 12.30 the reserves, or second line, arrived, 19th, 17th, 18th Brigades; but still the posttion could not be taken till 4.30, six hours after the first parallel was first reached. The other battles much the same tale of hours' long fights at the first parallel. The usual course of most of the German attacks show that the first advance usually failed to get within assaulting distance, but was brought to a standstill at several hundred paces. It then had to resist a counter attack and perhaps had to give ground at first, but, instead of retiring, we find the various companies firmly establishing themselves wherever a good fire position presented itself, and from thence stopping the advance of the counter attack. When reinforcements arrived the advance would be resumed. A long, almost stationary, fire fight might afterwards follow, lasting often for hours. During these long fire fights the units got much mixed up. There was also the deafening noise, and another marked feature was the great loss of officers and non-commissioned officers, leaving the line in many parts leaderless. These leaderless detachments constantly straggled backwards; the fields of 1870 were covered with them. Eventually the arrival of fresh reinforcements would enable the advance to be carried nearer to the enemy, and after a hot struggle the whole mass of skirmishers, consisting often of companies of various battalions, regiments, and even brigades and divisions mingled together, would be picked up and led forward to the assault by such of the senior officers as remained. It was found that the mixture of units at the first parallel cannot be avoided because under a hot fire closing to a flank is impossible. Moreover, as line comes up behind line on a limited frontage they must get mixed. It was found that at the first parallel the noise was so great that volleys were impossible as the men could not hear the fire commands. The troops in front became gradually "used up" and ineffective out of all proportion to the casualties. These "used-up" troops had to be reinforced from the rear, thus prematurely using up the reserves. The object of fire discipline is to overcome the causes which thus lead to troops becoming ineffective, and to insure that all who are not casualties shall form part of an effective organized firing line, however great the mixture of units, however great the noise, and however great the loss of leaders.

Attention having been so strongly drawn in 1870 to the great effect to be obtained from the breech-loader, the first efforts of officers to train our troops for the modern infantry fire fight were directed towards insuring an efficient collective fire. This was, of course, a necessary pre-

liminary to any further progress in fire discipline. It took a good many years to achieve, but it has now been managed. Our sectional fire or collective fire drills are now sufficiently good as regards the direction, control, and execution to allow fire discipline to turn its attention to its own particular object of overcoming the dissolving effect of the breech-loader. Our sectional fire is not perfect, because the men and even the non-commissioned officers are changing and going just as they are trained. But still we are in this respect better than foreign nations. Our sectional fire drills, if properly carried out, teach us all that is possible as regards the direction, control, and execution of fire under conditions approximating to those of the parade ground. What is required now is a series of simple fire discipline exercises starting where musketry drills leave off, and teaching the soldier to apply his musketry under conditions where normal formations are broken up and mixed, normal leaders are shot, and normal fire commands cannot be properly heard because of the deafening noise of musketry and artillery. We therefore have musketry to teach the soldier to fire under normal conditions, and fire discipline to teach him what to do under abnormal conditions. Fire discipline has to devise and practice remedial drills to overcome the difficulties which bar the way to the efficient application of musketry training. If fire discipline can overcome these difficulties then our present high musketry training will have a fair chance of producing good results in a European battle.

It is apparent that any fire-discipline drills must be few and simple as they have to be applied in the stress of battle, where only simplicity has a chance of success. However, they would have to be rapidly taught to the young soldiers and reservists who would fill up our ranks during war. So the fire discipline restricts itself to a few simple drills, dealing with the chief difficulties of the long fire fight at the first parallel. These chief difficulties are:—(a) The loss of formation and mixture of units; (b) the deafening noise and rapid expenditure of ammunition; (c) the great loss of leaders. Fire discipline consists, therefore, of remedial drills for these three great difficulties. The remedy for the mixture of units is the method of uplifted rifles. If all be true that we hear of the great noise of close breech-loader fights, then it is at least extremely doubtful if volleys can there be used. The German officers train their men to controlled mass or independent fire. In our sectional fire drills we are taught two descriptions of collective fire—volleys and independent firing—the former of which will merge into the latter as the troops advance into the closer and more effective fire of the enemy, as they lose their formations, and as the incessant din of the rapid firing breech-loader on both sides renders it more and more difficult for orders to be heard. With the present flat trajectory rifle we may consider 600 or 500 yards to be within the close effective fire of the enemy, and we may therefore assume the fixed-sight range as the place where volley firing will begin by stress of circumstances to merge into independent firing. That is to say

that at the decisive ranges the battle fire will be independent fire, and, further, that as the fire at decisive ranges is more important than the fire at medium ranges, that independent fire is more important than volley firing. It is, however, the common practice to use volleys up to the last moment almost and then to devote perhaps a minute or half a minute to independent fire. But from the point of view of fire discipline independent fire should be practiced at least as often as volley firing at all ranges within the fixed sight. This raises the question whether our independent fire is sufficiently controlled to act as an efficient alternative to volleys in action. As regards concentration of the fire there appears little to choose. But in the expenditure of ammunition is the weak point of our independent fire, for it is so rapid that it would soon empty the men's pouches. And we have to consider a fire fight that may last for hours.

If our independent firing is to be suitable for a long stationary or fluctuating fire fight we require a system of slow independent firing for use when it is desired to save ammunition or against bad targets, a rapid independent fire for use against good targets, and magazine independent against very good targets. If we require this slow fire we have not far to go for it; it is merely necessary to re-introduce the old-fashioned file firing and apply it to extended order; the other two rates we have already got. As regards the words of command for these three rates of fire it is obvious that the shorter an order is the more chance it has of getting heard. The absolute minimum is one short word. The following is therefore proposed. The men to be trained to regulate the rapidity of independent fire thus, the order for each rate to consist of one word only:—(1) "Slow" (file firing). No two men of a file must have their rifles at present together, but must fire alternately. In action any two men to work together; (2) "rapid" (present independent). Each man to fire directly he gets his aim; the rate of fire is hereby doubled; (3) "magazine" (present independent firing with magazines). Having regard to the fact that in a close conflict of breech-loaders only a few men close by can hear any order, it is obvious that it is of the first importance to train men to pass orders down the line. The great loss of leaders was very noticeable in 1870. Fire discipline must provide against that in future. This point is in Germany regarded as of the first importance, the soldier being so trained that if all his leaders are shot he may still fight on correctly. It is first necessary to teach the men their duties when left leaderless, such as to lie perfectly still and fight quietly rather than retire, and as he may have to stay there a long time he must husband his ammunition. If the enemy counter attacks, all he has to do is to lie still and fire steadily at his foe till he comes quite close, then jump up and go for him with the bayonet. He must obey the orders of the oldest soldier near him, and still keep to the ordered rates of fire. But when an attack is brought to a standstill for a time during the long fire fight at the first parallel and the enemy makes a strong counter attack there

is a danger that leaderless portions may give way and the rearward example thus set may spread along the line, so it is for this also that fire discipline must provide remedial drills.—*Army and Navy Gazette.*

VACCINATION AGAINST TYPHOID FEVER.

A very interesting paper on "Vaccination against Typhoid Fever," by the Professor and Assistant Professor of Pathology at the Army Medical School, Netley, appears in the *British Medical Journal* of January 30. The professors at Netley (Dr. A. E. Wright and Surgeon-Major D. Semple), acting on a suggestion of Professor Haffkine that the method of vaccination so effectual in combating cholera epidemics in India might be applied also as a prophylactic in typhoid, have gradually elaborated the method of anti-typhoid vaccination, described in the paper by them. They see every reason to hope that the immunity which is conferred by these anti-enteric vaccinations may persist for a considerable number of years. If it does so it will suffice to carry a young adult over the period of his extreme susceptibility. They venture to suggest that "it would be expedient for everyone who is likely to be frequently exposed to the risk of typhoid infection to undergo vaccination." In particular, say the professors, it would appear to be expedient in the cases of young soldiers going abroad to typhoid infected districts. The possibilities in the future from this treatment, as far as the ravages of enteric in India among our young soldiers are concerned, seem promising. These vaccinations are not attended by risk if moderate doses of typhoid vaccine are used. The duration of the immunity is an uncertain point. In the paper we learn the interesting and assuring fact that Professor Haffkine has performed nearly 100,000 anti-cholera inoculations without a death, or, so far as can be learnt, without a single serious symptom.—*Army and Navy Gazette.*

XUM

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Comment and Criticism.

I.

"Proper Military Instruction."

Major Arthur L. Wagner, A. A. G.

THE necessity of correcting some of the errors contained in the reply of Captain Pettit to my comments upon his prize essay, compels me to take notice of a scolding which I should otherwise receive merely in amused silence; for the Captain gives way to his feelings to such an extent as to violate quite comically the aphorisms which he quotes for the guidance of those who disagree with him.

As to the sensitiveness of the atmosphere at Leavenworth, I would say that the officers on duty at the Infantry and Cavalry School naturally object to unjust criticism, and that they can scarcely be expected to relish praise when it is so qualified as to constitute the faint variety which implies damnation. Probably no institution in this broad land has been the victim of so much ignorant criticism as the United States Infantry and Cavalry School, but perhaps it is not strange that such should be the case; for though the school as it existed a dozen years ago has very little in common with the institution of to-day, some people who knew the school at that time and who have not observed its progress since, continue to base their criticism upon a condition of affairs which has long ago passed away. This may be excusable on the part of those who have had neither opportunity nor occasion to investigate the present condition of the school; but when an officer undertakes in an essay to criticise the institution and assumes to point out the errors of those who have been in charge of it, all persons concerned have a right to demand that he should first learn enough about the subject of his criticism to give his remarks a reasonable claim to accuracy and justice. It is not a proper excuse for the Captain to say that he was not cognizant of the abolition of the marking system at Leavenworth nor of the practical work in the school year of 1895–96 because the report of the Commandant had not yet been published when the time had arrived for the competing essay to be turned in. He says that he has, and always has had, esteemed friends in the Leavenworth faculty. It seems incomprehensible, then, that as he knew nothing about the school from his own experience or observation, it did not occur to him to write to some of these friends and ask for information. They surely would have given him a courteous and full answer, would have obviated the necessity of waiting for a formal official report, and would have enabled him to criticise the institution intelligently, whether favorably or not. And I may here remark that, so far as I know, nobody at Fort Leavenworth would feel aggrieved at adverse criticism if it had at the least the merit, like some works of fiction, of being "founded upon fact."

In regard to the question, "Is the Infantry and Cavalry School wholly a post-graduate school," I still contend that it is, with the exception of the Depart-

ment of Law and a small portion of the course of Military Engineering. It is true that it has had, and will continue to have, students who are not graduates of any college or university, and who are not graduates of any military school. So, too, the Artillery School has graduated men who had never passed through a college or military academy, and it may graduate such men in the future. If it be proper to speak of the Artillery School as a post-graduate school, the same term will apply to the school at Fort Leavenworth. The Captain probably would not deny that the Engineer School at Willet's Point is a post-graduate school, yet, according to his peculiar reasoning, if a single officer not a graduate of West Point were sent to take the course of study at that institution it would at once cease to be a post-graduate school. He would evidently have us classify our service schools not according to their curricula but according to the past history of their students. The Captain says: "If these men [officers promoted from the ranks] can start on equal terms in Law, Ordnance, Gunnery, Military Engineering, and Art of War with the graduates of the Military Academy, who are supposed to have had rigid training in these branches, there is something loose somewhere and the sooner we locate it the better for both schools." If he were aware of the existing conditions, I think he would see that there is nothing loose in regard to either school. As to Law, every officer promoted from the ranks passes an examination in Constitutional and International Law, and unless we assume that the examining boards are incompetent or the examinations a farce, we must grant that these officers are proficient in the branches mentioned. The subjects of Ordnance and Gunnery, especially if carried to any extent, belong not to the Infantry and Cavalry School nor to a war college, but to a technical school for artillerists, such as the one at Fort Monroe. As to the subjects of practical Military Engineering and the Art of War, it is not plain that a graduate of West Point has any appreciable advantage over any other officer who possesses a good education and a well-trained mind; for though the course in these subjects at the Military Academy is carefully taught, it cannot be regarded as anything more than an elementary one in comparison with the courses at the post-graduate schools. As the colonel of each regiment is now required before designating an officer for instruction at Fort Leavenworth to ascertain his proficiency in algebra, geometry, trigonometry and certain other subjects, it is no longer, to any appreciable degree, "a school for young lieutenants of various and unknown abilities and previous training." In fact, the difference in the previous training of the students is by no means so great as it is in a class of "plebes" at West Point, and, so far as I have been able to learn, no sane person has yet recommended that the course at the Military Academy should be held down to the needs of the most poorly-prepared student. Had such a course been followed, West Point would not have a world-wide reputation to-day, but would probably have been abolished long ago.

In considering the scope and the aim of the Infantry and Cavalry School, we should take into consideration the altered conditions in regard to the promotion of officers. While the requirements of the examination for promotion from the ranks are not probably as great as they should be, they are such at present as to make it reasonably sure that dullards will no longer be commissioned. There will consequently be an improvement in the personnel of the army. The increased scope and quality of post instruction should be considered also. Some years ago the subjects of topography and tactics, in the proper acceptation of the term, were taught to the infantry and cavalry at Fort

Leavenworth alone. The elements of these subjects are now taught at every military post in the army, and the School has progressed to the position of one for the further instruction of able officers having a good preparation to begin with, instead of being the "Kindergarten" of earlier days.

I do not agree with the Captain that a war college is not yet a necessity, for such a college is needed by any nation that regards war as even a remote possibility. Nor do I agree with him that such an institution should have as students "officers of rank and experience." I have no sympathy with the spirit which would forever keep young officers in the swaddling clothes of their profession, nor with the prejudice that would gauge the capacity of military men by the color of their facings or the insignia on their shoulder-straps. The War of Secession taught us that many young officers were capable of exercising high command, and similar officers may be regarded to-day as at least fitted to study the duties required of military leaders. It is much better to educate young officers in the highest branches of their profession, than to fill old men with military erudition just before they go on the retired list "by operation of law." In the great Berlin Kriegs-Akademie, which is the model war college of the world, and at which the highest military problems are considered, the average age of the students is somewhat less than that of the members of the present class at Fort Leavenworth. As colonels are now expected to send competent men to the Infantry and Cavalry School, and as they presumably obey their instructions, no fault can be found with the student personnel. If occasionally an unsatisfactory man receives the detail, he constitutes a mere exception, and, in the language of the Captain, "a school cannot be suceessfully conducted on exceptions."

The Captain is mistaken in supposing that the discontinuance of the division of the students into two classes was due to material reasons, such as lack of quarters, etc. The change was made because the improvement of the personnel of the service was constantly diminishing the number of men of the second class; because it was felt that it was absurd to have an officers' school for the purpose of teaching common-school branches; and because it was manifestly unjust to the able men in one class to share the honors of a diploma with the mental cripples of another. It has been desired for some time to have two classes at Fort Leavenworth, but it has been the wish and expectation that they should take the same course, the object of the two classes being that one might graduate each year. This formation of two classes—a doubling of the school—has not been carried out for material reasons, such as lack of quarters, and it is very possible that the Captain may have been misled by this fact. It may be that he is less than a decade ahead of the times in his prophecy that there will again be two different classes of the old style, with separate courses, at Fort Leavenworth, but if so his accuracy as a prophet is to be deplored. The progress of the school dates from the abolition of the second-class course, and if it should again have a special class in school-boy branches, it would at once fall from its present high estate, and revert to the condition of a so-called kindergarten. For my own part I do not believe that the clock of progress is to be set back to such a degree.

I am surprised at the Captain's comments upon the plate representing the formation of an outpost in "The Service of Security and Information;" for the map in question was drawn for me by one of the most accomplished draughtsmen and topographers in the army, *and it is correct.* It has never before

required explanation, but as the Captain evidently needs instruction in the matter, I will explain that in the map referred to the road descends from D toward the stream by running obliquely down the hill as shown, but from F to F′ there is a cutting on the *up* side and a corresponding embankment on the *lower* side of the road so that the middle contour of the hill "P," instead of terminating at F, merely crosses the road at that point [contours are not drawn *across* roads] and continues, via the embankment referred to, from D to the edge of the map. The next lower contour approaches from this same hill, strikes the road at D′, continues along the embankment to F′ and then goes along parallel to the stream until it reaches the edge of the map. No contour is "stopped in its mad career by a night picket," nor by anything else except the limits of the map. As to the absence of a scale on the map, it is sufficient to say that none is necessary, as the text gives clearly the various outpost distances and intervals and states that they vary within reasonable limits according to the terrain. The Captain might as well have objected to the absence of all indication of latitude and longitude on the map.

The attempt to magnify the trivial *supposed* defect into "flagrant and ludicrous error" may be charitably dismissed without comment; and other remarks in the Captain's reply may be passed over in silence, not because they are correct but because they are not deemed of sufficient importance to call for refutation.

II.

"The Question of an Artillery Reserve."

Major James Chester, U. S. Artillery.

LIEUT. BIRKHIMER'S discussion of "The Question of an Artillery Reserve" in the May number will be entirely satisfactory to most artillery officers. He views the question exclusively from an American point of view, and reaches the conclusion that, whether European armies need an artillery reserve or not, every large army which can be mobilized in this country must have one. It is needless to recapitulate his arguments. They are sensible and sound, and ought to be convincing. But some men who have studied the art of war exclusively from books, will doubtless refuse to be convinced. They have come to believe that war is an exact science and that the secret of success is to be found in peculiarities of armament, organization or manœuvre. It has always been so. The great Frederick's success was attributed to his oblique order, and Napoleon's to his column of attack, until others tried to copy these seemingly simple manœuvres and met with disaster. And so the grand successes of the German armies in 1870-71, which were accomplished without a regularly organized army artillery reserve, may not have been altogether due to that peculiarity, and copyists may come to grief again.

But Lieut. Birkhimer's thesis can be maintained on general principles. The army artillery reserve is a tactical necessity in all armies consisting of two or more corps. It is the personal weapon of the General-in-chief. Of course, there are fields, such as the Wilderness of Virginia, where artillery is only an encumbrance. But these are exceptional, and wherever artillery can be used the artillery reserve is important if not indispensable. Prince Frederick Charles felt the truth of this when he improvised an artillery reserve at the opening of the battle of Gravelotte, thereby emasculating an army corps.

Perhaps the ill-favor in which the artillery reserve is held is due in some

measure to a misunderstanding of its uses, and a misconception of the rôle which it plays in the drama of battle. Many believe that it is a mass of artillery held in hand to meet emergencies, and that it may never be called upon to fire a shot. This is a great mistake. The artillery reserve is the weapon with which the General in chief strikes the decisive blow. Let me illustrate. Two armies, well matched in every way, confront each other. They have reconnoitred and felt each other until the positions of their first lines are fairly well known to each. But the thunderbolt is invisible. He who has elected to play the defensive rôle would give anything to know its whereabout, but that is his adversary's secret.

At length the battle opens all along the line, division against division ; battery against battery. If the armies are well matched such a battle may continue a whole day, and probably several days. That is what I call a soldiers' battle. Tactics have nothing to do with it. Pluck and marksmanship have supplanted the art of war. For armies that fight in that way, I concede that an artillery reserve would be a surperfluous organization. And so also where armies are not well matched. Edhem Pasha needs no artillery reserve. The Germans needed none after Gravelotte. But where armies are well matched, and tactics have to decide the day, an artillery reserve is indispensable.

Amid the turmoil and roar of battle all along the line—which may be as much as ten and is rarely less than five miles in length—the assailant masses his artillery reserve out of sight of but opposite to the point selected for attack. The necessary orders are given to adjacent corps and the army reserve, and then the thunderbolt is launched upon the enemy. The whole artillery reserve dashes forward into battery, and the enemy's artillery is overwhelmed. It cannot be otherwise. The odds against him at the selected point may easily be 6 guns to 1. Five minutes should finish the duel. Then the guns are turned on the enemy's infantry. If five minutes fail to finish it, bad gunnery is to blame, and not bad tactics.

The moment the defender's batteries are silenced the assailant's infantry advance accompanied by the corps artillery. There will be at least one division and it will advance rapidly in three or four lines. When it has gained assaulting distance the reserve artillery increases the elevation of its guns at least one degree, and continues the fire for the purpose of disconcerting the defender's supports and breaking up his masses in reserve. And thus the assault is delivered and ought to succeed.

Such is the rôle of the artillery reserve in the drama of battle, and the question is, Could it be omitted? We answer, certainly ; but the battle would become a soldiers' battle. I admit that on the march the artillery reserve is an encumbrance. But so is the corps artillery and the baggage wagons. They are not to be discarded on that account. The question is not, Is the artillery reserve an encumbrance at any time?—but, Is it ever a necessity?

General E. P. Alexander, Chief of Artillery, Longstreet's Corps, Army Northern Virginia.

I can hardly think that any artillerist, with his personal experience on this very point, could fail to appreciate the great facilities given by the very existence of an army artillery reserve.

The only reason openly assigned for breaking up the artillery reserve of the Army of Northern Virginia in June, 1863, aside from the organization then of

another army corps, was scarcity of equipment and difficulty of getting horses and keeping them in forage during active campaigns. Up to that time our army organization had been in two corps, Longstreet's (1st) and Jackson's (2d), each with four divisions of infantry and with four or five brigades in each division, and each corps was supposed to have about 100 guns; besides, General Pendleton, the chief of artillery of the army, had an artillery reserve of two battalions of three batteries each. When the third army corps was organized, all the artillery was thrown into corps artillery, and the army artillery reserve broken up.

Apart from the difficulty of getting an equipment for an army artillery reserve, straitened as were the Confederate resources at that time, I have no doubt but that the manner in which the chief of artillery managed affairs had much to do with bringing General Lee to the determination to dispense with it.

To put it as briefly as possible, I would say that I heartily favor an army artillery reserve, 1st, because it furnishes a source whence a severe disaster to artillery of a corps can be instantly repaired. 2d, as a sort of hospital where crippled batteries can be treated and restored at leisure. 3d, as a sort of buffer between the chief of artillery of an army and the different corps commanders in preventing friction and petty collisions when the chief of artillery has special calls to detach or to concentrate artillery, enabling him to do so without interfering with the artillery of army corps. It thus prevents the generation of a spirit of antagonism or jealousy which is very apt to arise in the sort of unavoidable conflict of authority between the corps commanders and the army chief of artillery as to the movements and use of the batteries serving with each corps. This is a really very grave matter. 4th, as a fighting element, to be put in by the army commander whenever he thinks the decisive moment has come, or for any other special service that he may have for artillery to do, and which he prefers to do without interfering with corps or divisional artillery.

III.

"The National Guard, National in Name Only."

Lt.-Col. C. W. King, A. A. G., Iowa National Guard.

WITH a desire only to correct any impression of error which may have taken root from the article written by Colonel Frazier, the reader's attention is invited to his reference to the "question of enlistment." He says: "The members of the guard have obligated themselves to serve the State, not the National government, so it must remain optional with every guardsman, etc." There have been so many competent and able writers, who have shown so plainly, that the above statement is incorrect, that it will not be my purpose to do more than show that the Iowa National Guard at least, is by intent and in fact, subject to the call of the President as Commander-in-chief, by requisition or order.

When the President makes requisition—he requires—he orders—by the power of his prerogative as Commander-in-chief, he demands obedience to his will. And Iowa *et al must obey*.—Section 3.—Military Code of Iowa reads as follows:

"When a requisition shall be made by the president of the United States for troops, the Governor as Commander-in-chief by his proclamation *shall order out* for service the *active militia* or *National Guard of the State* or such portion

thereof as may be necessary: if the number is insufficient *he shall order out the remainder*," etc.

Is there any doubt, or loop hole in the positive "*shall*" of this section?

Now what does the soldier or member of the National Guard of Iowa understand by the solemn oath, which he takes when entering upon its service? It is embodied in the Military Code of Iowa, Section 10, and reads: "You do solemnly swear (or affirm) that you will bear true allegiance to, and that you will support the Constitution of the United States and the State of Iowa, and that you will serve the Stata of Iowa faithfully in its military service for the term of three (one or two) years ("one or two," applies to reënlistments only), unless sooner discharged or you cease to become a citizen thereof; that you will *obey* the *orders* of the *Commander-in-chief*, and *such officers* as may be placed over *you*, and the *laws governing* the *military forces* of *Iowa*—so help you God.

The imperative nature of this oath is plain, for the Commander-in-chief of the United States is as surely such of Iowa, as Iowa is a part of the United States. The President orders the Governor—the Governor orders the brigade and regimental commanders and "*such officers*" as the enlisted man has taken oath to obey—the rules of discipline are well understood—and are not the "*laws governing* the *military forces* of *Iowa*" a part of ; are they not subservient to the laws of the United States? It seems to me most forceful and pregnant with allegiance, with no room for the shadow of a doubt that he who takes this oath *must obey* its solemn conditions, if he be honorable.

Is this oath ambiguous? Can there possibly be other than loyalty of purpose contained therein? Is there material difference between this oath and the oath taken for service in the Army of the United States? Aside from the phraseology, the undersigned can see nothing which is not synonymous, and which does not contain the—*must*—*will*—or *shall*, all answering negatively to the above questions. About the only requirements the National Guardsmen of Iowa will have to become soldiers in the service of the United States, would be a short ceremony of muster, the certifying of rolls, possibly followed by the issue of ammunition, haversacks and S. B., and should congress "take the notion" of looking to the supply of men, to man the coast defenses, which it has partially provided for, and deem it advisable to have a few trained soldiers in readiness to respond to a call to arms, providing a decent appropriation to equip them, to the exclusion of appropriations for the extermination of weeds or some other equally useless nonsense, they may have occasion to be thankful for having taken heed of the advice of Washington, Lincoln, Grant, Sherman and many more lesser but true and sincere patriots, and there will be no occasion for a citizen of these United States—be he civilian or soldier to edit an article entitled "The National Guard, *national in name only*," and *men* will not hesitate and counsel over the phraseology of their enlistment oath when *Old Glory* is assailed.

Reviews and Exchanges.

The Federal Defense of Australasia.

CAPTAIN MAHAN has fired a literary shot heard half way round the world, at any rate, for an echo comes to us from Australasia in the form of a plea for Federal Defense of the British Pacific Colonies included in that group, the foundation of such defense to be England's supremacy on the sea. It was written by George Cathcart Craig, editor of the *Australian Army, Navy and Defense Review*, and author of several books on colonial history.

The first half of the work gives an outline of the growth of the Australian colony, its part in the commerce of the Pacific, political and military reasons for a proper defense both on land and sea, and the present inadequate military system and policy. The rest of the book contains the author's scheme of Federal Defense, worked out to careful, theoretical details, with an evident lack of intimacy with the thousand practical military difficulties.

The author is plainly fighting for the cause of Australasian Federation in the face of intercolonial jealousies, commercial greed, socialistic opposition and the fear of Imperialism. He does not attempt to cajole any of these hostile elements, but attacks boldly and saucily. The sentiment most necessary to combat is an evident dislike or distrust of the Imperial control. With this the author labors seriously and repeatedly. In contravening this he shows that the principal danger to be feared is that which would menace Australasian commerce were Imperial protection withdrawn. This he proves to be real and obvious by reason of the presence, on nearly every side of the island possessions of Germany, France and Japan; the unfriendly advance of Russia into the Pacific by way of Corea or China; and the political combinations against England in Europe to lessen her prestige as mistress of the seas.

The argument is confusing at times and disjointed, and the plain evidence of strong partisanship might warn those of us who may have but hazy knowledge of the Australasian situation, that there may be another side to this question. Nevertheless, it is easy to convince by the facts as stated that the only sensible course to adopt is the system of a Federal defense, linked, as the author wishes, with the sea-power of Great Britain.

The key-note after all, as one would suppose when British colonies are concerned, is the advantage to trade. The author says, "In this book it will be seen that my main argument for urgent Federal defense, apart from race sentiment, is the expansion of Australian trade in the Pacific, the conservation and further development of trade with the mother country, together with the protection of the same, and the ulterior question which Australasian defense gives as to security for the investment of home capital, and for developing the resources and varied products of Australia." He outlines the national policy of the colonies to be "to develop their manifold resources, live in peace with all

nations, buy and sell in every market, securing the trade of the Pacific, enjoy the blessings of free government, and join the mother country in all things pertaining to the expansion and defense of trade, commerce and the Colonies."

The situation in Australasia as described, would offer certainly a tempting conquest to the land-greedy nations of Europe, were there a coalition strong enough to dispute the control of the sea with England. The stage in governmental development which these colonies have reached, as disclosed by this book, seems to make a separation from the Empire most unwise. There is total lack of unity among the colonies, the result of past trade jealousies and political strifes. The defense on land and sea is left to each colony within its own borders, and in consequence, this important function of government is divided into seven distinct commands and no one force may enter with arms the territory of a neighboring colony. Of course nothing could be more deplorable nor foolish. In addition to outlay necessary to support these several military and naval establishments, the colonies contribute, grudgingly, to the maintenance of the Imperial navy an amount equal to about one-seventy-fifth of the total cost, or about thirty cents per capita. When the full measure of England's sea-power to the safety of distant colonies is considered, this becomes but a moderate tax. Plainly, the way out of this absurd military and naval tangle is in Federal defense. The advantages of such a system are too evident to need stating, though the author carefully elaborates his idea and presents it by every possible favorable argument. It must be remembered that he is at war with a strong decentralizing sentiment, kept alive by trade and political jealousies blind enough to foster the grotesque military policy as outlined above.

In his efforts to prove to an unmilitary people the necessity for using the same good sense in military organization that they employ in developing trade, the author recalls the ceasless warnings given our own legislators on our unpreparedness for war and our utter lack of system and modern organization. We recognize an old acquaintance in the fateful lessons to be learned from Austria in 1866, from France in 1870, from China in 1893—and, now we may add, from Greece in 1897. There is something very familiar in the expressions "log rolling," "the next election," which recall the death struggles of our oft-perished hopes.

The part of the book most interesting to army and navy readers is that containing the Federal defense scheme as formulated by the author before a conference of commandants of the various colonial military establishments. Under the present system of independent, colonial quotas, without a federal plan for mobilization and concentration, the total forces in 1891 were:

Permanent and staff	1,245
Militia	12,936
Volunteers	11,518
Reserve and rifle companies	9,576
	35,275
Cadet Corps	12,314
	47,589

The above were reduced to about 25,000 in 1896. These numbers, exclusive of reserve and cadet corps, correspond very closely with the total active force of

Canada; namely, 25,014 men, the population of the two colonies being about equal. The Canadian organization, however, is Federal and the author has in view the adoption of a similar plan with the added feature of a scientific plan for mobilization and expansion, qualities almost ignored in the defense scheme of Canada.

The proposed organization consists of: (1) A permanent force; (2) Militia; (3) Volunteers; (4) Conscripts. The permanent force or Federal army to consist of:

Staff, all branches	300
Cavalry	300
Mounted infantry	300
Field artillery	500
Fortress artillery	2,500
Submarine miners and torpedo corps	100
Model Guard Regiment (infantry)	1,000
Army Service Corps	100
Medical Corps	100
Engineers	100
	5,300

These together with the militia, 11,500; the volunteers, 34,000; make a total peace establishment of 50,800. There may be two conscriptions of 50,000 each for war purposes, bringing up the total war footing to 150,800. Of the peace force he says: "The total number for a peace footing is calculated upon what the population will be in five years hence and the 50,800 troops of all arms should be quite sufficient to repel any invasion, provided that our railroads are available and the enemy kept well pinned to the coast, or rather to the offing of any landing place." The term of enlistment for the regular service is to be twenty-one years, ten years with the colors and eleven in the active Reserve. The principal differences between volunteers and militia are: Difference in pay in favor of the latter; shorter length of service and fewer days of field drill for the former; the militiaman serving for seven years with 40 days drill and the volunteer for five years with 30 days drill per annum. The active reserves are made up of men who have served their allotted time in the regulars, militia and volunteers with a determined length of such service for each class.

A noted feature in the organization of the permanent force is the prominence given the artillery, this arm being three times as numerous as the infantry and ten times the strength of the cavalry. This is a proper modern appreciation of the need of dependence on the regular establishment for trained artillery-men, a class almost impossible to supply from militia, except perhaps in the light field arm. Australasia's great length of seaboard, her thousand islands and her scattered harbors, imperatively call for a thorough organization on a liberal basis of sea-coast artillery. This fact the author fully realizes and his presentation of the requirements and value of modern coast defense, especially in its relation to a defending naval force forms the most interesting and instructive chapters of his book.

The Federal Navy of Australasia is to be organized on lines similar to the army; the fleet to be supplied by and built in the Colonies and to form a second line to the Royal fleet and to coöperate with the land forces for harbor defense. At present each colony supplies its own navy, with the natural consequence of

a collection of almost worthless mosquito fleets, obsolete, slow and poorly armed.

Under the act creating these land and sea forces, it is prescribed that there be a Council of War to which all matters connected with the naval and military defense is referred and which, in conjunction with the Governor-General, in the name of the Queen, the military Commander-in-chief (a lieutenant-general of the Imperial army), the naval Commander-in-chief (a senior captain of the Royal navy), deliberate, resolve upon, and manage the best schemes of Federal organization, discipline, mobilization and defense.

It is well that Australasia has heard thus early in her career as a growing state, so vigorous a voice on the subject of her future defenses. The existing military conditions in these colonies are certainly unworthy a modern people; but there seems to be a public desire for better things, repressed perhaps by the fear that a Federal military establishment means a centralized political organization and from that to hated Imperialism. The author is an ardent Federalist.

There is naturally a strong local atmosphere throughout the book and its plain language has no doubt created quite a ripple of comment in military and political circles of Australasia. The literary quality of the book is not of a high order, as shown in a crudeness of style at times; and occasional improprieties in grammatical construction. There are, however, a vigor of treatment and a straightforwardness of statement which, for the author's sake, I trust are supported by the facts. H. L. H.

Conversations on Cavalry.*

As long ago as June, 1892, the Conversations on Cavalry, by Prince Kraft zu Hohenlohe-Ingelfingen, translated by Lieutenant Carl Reichmann, 9th U. S. Infantry, began making their appearance in the *Journal of the U. S. Cavalry Association*,—the last installment appearing in the *Journal* of June, 1896. These Conversations (Gespräche über Reiterei), edited by Captain F. N. Maude, have just made their appearance in England in book form, the publishers being Messrs. J. J. Keliher & Co., and have rightly created quite a sensation among English cavalry officers, to whom, in spite of the fact that they have been before United States officers for five years, they seem to be a revelation.

The conversations take the form of question and answer between "H"—Prince Hohenlohe, and "S,"—generally supposed to be General Von Senfft-Pilsach, and although not entirely free from repetition, for which the author apologizes in the preface, have a charm through the very absence of conventionality.

"S" believes that far too much praise has been accorded the German cavalry of 1870, and denies that it was properly used or well led; that its action was correct, or that its achievements were satisfactory. He points out that Vinoy escaped to Paris when the German cavalry should have cut the railroad in his rear, and that the approach of the French armies to relieve Paris was not heralded by the German cavalry until the enemy was close at hand.

Eight conversations are devoted to the history of the Prussian cavalry, from the time of Frederick the Great, comprising the training of the older soldiers and the training of horses in the time of Frederick the Great, the Decline of the Prussian Cavalry, Reconstruction of the Cavalry after 1815, Riding Instruc-

* *Conversations on Cavalry.* By Kraft, Prince zu Hohenlohe-Ingelfingen. J. J. Keliher & Co. London. 1897.

tions and Riding Inspections, and the Progress of the Cavalry from 1843 to the Present Time.

Under the last, Prince Hohenlohe epitomizes the improvements made in the cavalry after 1870, under the following heads:

1. Care in the training in reconnaissance service, by the instruction of officers, as well as by rendering the horses capable of long continued rapid movement. 2. Definite but elastic rules for the leading of large bodies. 3. Greater mobility of the masses by the introduction of the squadron column, regimental column, dressing towards the centre in platoon and squadron, removal of the term inversion, and of all evolutions which have no tactical, warlike purpose. 4. Importance attached to individual training and individual riding. 5, Armament of the cavalry with a long range fire-arm, and thorough instruction of every horseman in firing.

Beginning with the ninth Conversation, the work embraces The Preliminary Training and Selection of Remount Riders, The Preparatory Aids and Preparation for the Training Proper of Remounts, The Training Proper of Remounts, The Training of the Recruits, The Subsequent Training of the Older Men and Horses, Summer Exercises and Devout Wishes.

Preparation of cavalry for war, if sifted down to its ultimate details, may be said to depend upon the thorough training of horse and rider; and this in turn, depend upon the proper training of remounts and recruits. In the military service, first impressions are of paramount importance, and the Conversations dwell at length upon the individual training of men and horses, according to the principles laid down by the Great Frederick, through the development of which his cavalry reached the zenith of its efficiency at Rossbach and Leuthen.

The reading of the work, although, of course, intended primarily for German cavalry officers, cannot but inspire cavalry officers of all countries with admiration for the thoroughness of the German system, and help them to aspire towards the ideal. The monotony of routine drills, with the present infrequent opportunities for active field service, must affect officers and men unfavorably. Our army is in a transition state, and to no people is this more apparent than to officers stationed at non-frontier posts. New duties are constantly presenting themselves to the three arms, and they find themselves obliged to conform to new conditions. In spite of the decrease in such arduous duties as Indian scouting in most disagreeable climates, duties none the less important, and training none the less arduous in its very monotony, have taken their place. "Habit and ease," says "S," "will cling to what has become custom since the Great King's decease. Whether it will be possible to overcome them, who can tell? How long it will take depends on the authorities who endeavor to carry it out, and the more or less determined stand they take. The cavalry will improve constantly and gradually. * * * Let everyone do his duty in peace, not alone the duties of the service, for these duties our zealous officers perform most conscientiously. I mean the duty of reflection on one's arm, and of doing away with pernicious traditions. Then the arm will perform deeds as glorious as were those under Frederick the Great and Seidlitz. It can do it, it will do it, notwithstanding the long range of modern arms. Let the way to the goal be shown. Officers as brave as ours will do anything that may be asked, if they are only shown how."

C. D. RHODES,
1st Lieut. 6th Cavalry.

Root's Military Topography and Sketching.*

This work is the text-book on the subject at the Infantry and Cavalry school, and has recently been designated as the authorized work on the subject for examination of officers for promotion.

It has certainly had great advantages; its author, after having served two years as a student at the school, was for five years an instructor in this same subject at this institution; the first edition has been used one year, and now this, the second edition, is revised and enlarged by the Department of Engineering. Not, however, satisfied with this, in order that perfection may be attained, "It is the desire of the author, Lieutenant E. A. Root, 19th Infantry, that the book be given the benefit of criticism and experience incident to its use, * * * and that in succeeding editions it be kept up to date, * * *" thus evidencing the proper spirit in which such a work should be issued. The origin of the work seems to have been to obtain one text-book for a class of students, some of whom had either none or but limited knowledge of surveying and whose time for instruction is limited, which would lead up to the military use of maps, or, as the author states it—who makes no claim for originality, but for compilation only—"with the view of bringing together in one volume so much of the subject of topography and sketching as may be useful to military officers in their varied duties, and to cover the subject as taught from a number of books, lectures, notes, etc., in the Department of Engineering at the U. S. Infantry and Cavalry School."

It is divided into two parts: Part I., Topographical Surveying; Part II., Topographical Sketching to which is added an appendix, consisting of tables useful to the surveyor. There is a pocket in the end cover, which contains a map of a portion of the battle-field of Gettysburg, on a scale of one inch to one thousand feet, which is made use of in problems, etc., in the text, and also two useful forms, with the information to be given under various headings noted thereon, one for reconnaisance of road, the other for that of position.

The book is well illustrated with plates and diagrams to explain the subjects under discussion, and their elucidation is in plain language that can be understood by any reasonable person.

The arrangement of the subjects is one that naturally leads up to the main subject aimed at.

Thus Part I. begins with "General Principles." Here the subject of military topography is defined; an explanation why the ordinary civil maps are not satisfactory for all war purposes, thus showing the military value of ability to obtain and report such information as is not usually found on the ordinary maps.

In connection with the subject of topographic sketching, which is in effect here defined as "a less accurate method of topographic surveying, in which the observations and measurements are generally made with instruments only approximately accurate, or they are simply estimated, and the representations are usually drawn free-hand," there is the following statement: "To record his observations in time of war, the military topographer will most frequently employ the method of sketching, especially in reporting upon the tactical capabilities of ground in anticipation of some military operation.

"The end then desired is to make accurate sketches; the method here fol-

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* *Root's Military Topography and Sketching.* Second Edition.

lowed to teach this is, first, to examine the methods and instruments with which large surveys are made, and then take up the more rapid and necessarily less accurate sketches executed for military or other purposes of a temporary character."

This is followed in order by chapters on "Drawing Materials," "Instruments and Their Uses," "Scales," "Verniers," "Instruments for Measuring Distances," "Expansion of a Survey," "The Engineer's Transit," "The Compass," "The Plane Table," "The Nye Level," "Methods Used in Filling In," "Solar Attachments," "The Sextant," "The Aneroid Barometer."

Part II.: "Measurement of Distances," "Measurement of Directions," "Measurement of Slopes," "Conventional Signs and Symbols," "Finishing Maps," "Map Reading," "Copying Maps," "Methods of Field Work," "Map Plotting from Data," "Military Reconnaissance," "Laying Out Roads."

The system of explanation of these various subjects is similar, consisting, first, of the description or definition; next, the method of using it or its purpose; and, finally, some practical problems illustrating its use.

Hints on Stable Management; Equitation, Etc.

From Gale and Polden, Aldershot, come two little booklets,* Hints on Stable Management, by Captain W. F. Rimington, Inniskilling Dragoons, and Questions and Answers on the Theory and Practice of Equitation for the Course of Squadron Training, by Major Van Cortlandt, 3d K. O. Hussars.

The former little work touches briefly but intelligently upon the subjects of Forage, Conditioning Horses, Grooming, Shoeing and the Feet, Care of Horses in the Stable, Bitting and Leaving Ranks, on the March and in Camp.

The latter work on Equitation, is so put in the form of Questions and Answers, as to be easily comprehended by the most sluggish intellect.

Both booklets are, as their authors state in the preface, of an elementary character, intended chiefly as an aid to junior officers with little practical experience, and to non-commissioned officers.

It is believed that beneficial results would follow the purchase of several of these concise but comprehensive little works, for troop and post libraries.

C. D. R.

General Grant.†

General Wilson who had the privilege of personal relation and intercourse with General Grant for a period of nearly a quarter of a century, was a soldier of distinction during the War of the Rebellion, and is an author well known in many lands, is peculiarly well fitted to edit the twelfth volume of the Great Commander series. That General Wilson has given to the public a very interesting book cannot be gainsaid, nor can the fact be disputed that he has clearly traced those events in the life of General Grant, from his birth to his death, which made his career so remarkable.

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* *Hints on Stable Management.* By Captain M. F. Rimington, Inniskilling Dragoons. Gale and Polden, Ltd., Aldershot, one shilling, post free, to any part of the world.

Questions and Answers on the Theory and Practice of Equitation for the Course of Squadron Training. By Major A. J. R. Van Cortlandt, 3d K. O. Hussars. Gale and Polden, Ltd., Aldershot, nine pence post free to any part of the world.

† *General Grant—Great Commander Series.* By James Grant Wilson. New York: D. Appleton & Company. 1897.

Two chapters—forty-five pages—are given to his ancestry, birth, boyhood, and career at the United States Military Academy, while eleven short pages cover the entire period of eight years during which General Grant was President of these United States. On first thought this seems to be a somewhat singular division of space when the relative importance of these periods of the General's life are considered. However, it is indeed rare that the early life of men, whose names and fame resound through the world, does not present many traits and incidents that fully explain the sometimes marvelous events of the after career : we should not be surprised when such follow. The early history of General Grant emphasizes this condition. To the youth and young men of the country this period of his life will appeal most strongly, and for them will be the most valuable lesson. His courage as shown in the many incidents narrated of the events of his boyhood, explains his coolness under fire when in battle and his heedlessness of danger when necessary to expose himself to gain a desired end ; his respect for his parents, as shown by his early letters, and deeds, and his unhesitating and unquestioning obedience to their wishes, explains his ready submission in mind and deed to law and authority on every occasion in later life, of which so many instances are given ; the respect of his fellow cadets for his sound common sense and good judgment accounts for these qualities when in command of armies and his abiding faith in his subordinates and himself, instances of which are repeatedly given in every chapter of the book. Will any person say that General Wilson in thus sacrificing the details of General Grant's civil administration of the affairs of the country—of which some were momentous and showed that his capacity as a civil administrator was in no wise inferior to his abilities as a military commander—to a narrative of the events of his youth and his part in two wars, has failed to present a less valuable and instructed biography?

In the chapter on the campaign in Mexico is shown the desire of Lieutenant Grant to do his whole duty, for as regimental quartermaster he is found in every fight when he had good reason and good excuse to be elsewhere ; he makes a record in this respect. Here also he is found turning the enemy's flank, a movement carried out on a grand scale many times later in his career.

The story of the Civil War, from Belmont to Appomattox, is told in a way that holds the attention throughout and is most interesting. In appropriate places narratives of events are recorded to illustrate and impress upon the mind of the reader the salient traits of character of General Grant, and we find them all in a line—more fully developed perhaps—with those of his earlier life and career. Fac-simile reproductions of letters and documents, which are of historical interest, and the subject matter of which make history, are given, some for the first time. The maps accompanying this part of the work are excellent and greatly aid a proper and correct understanding of battles and the movements leading up to them. There is a chapter headed, "Correspondence with a Friend," in which is given a number of letters written to the Honorable E. B. Washburne between 1861 and 1869 and which are here published for the first time. After reading these letters one's mine naturally reverts to the closing paragraph of Chapter II. and the conclusion is reached that the judgment of a friend in the character of General Grant, recorded in the following words—"betrayed no trust, falsified no word, violated no rights, manifested no tyranny, sought no personal aggrandizement, complained of no hardship, displayed no jealousy, opposed no subordinate, but in whatever sphere protected every in-

terest, upheld his flag, and was ever known by his humanity, sagacity, courage, and honor," is correct.

FRANK H. EDMUNDS,
Captain 1st Infantry.

The Dickman Field Holder.*

This valuable and handy pocket-book has been prepared by First Lieut. J. T. Dickman, 3d Cavalry, for use in the instruction of troops in field duties, and especially for actual service in the field in time of war. The holder consists of a water-proof cover, containing a pocket, a pencil, and a pad of report blanks. Each blank is prepared on one side for a topographical sketch, and on the other for a written report, the whole being so arranged so as to fold neatly in the form of a small envelope. The pad is detachable, so that the report blanks, when exhausted, can be replaced with another pad. The practical utility of the Dickman Field Holder is apparent at a glance, and it will be a boon to officers in field exercises, and still more so in actual war. W.

Handbook for Light Artillery †

In preparing this work it has been the author's endeavor to place in compact form all the data he could obtain that might prove of service to those persons interested in the subject of light artillery, both in the Regular Army and in the National Guard.

He has held strictly to the lines laid down in Army Regulations, Drill Regulations, Official Reports, etc., as regards the matter extracted from such sources; and such as has not been so obtained has been carefully selected from the best authorities he has been able to consult.

He makes no claim to originality in this work. It is drawn on the lines of similar handbooks in foreign services; and a great deal of the matter has been copied verbatim from the works consulted.

While he does not consider that machine-guns are proper weapons for the light artillerist, he feels that occasions may arise when knowledge regarding them may prove of service; hence the chapter pertaining to them.

The volume is well and clearly printed and is well worthy of a place on the shelves of every light-artillery officer whether of the Regular Army or National Guard.

The Naval Annual.‡

In the excellence and utility of its contents and the variety of its interests the *Naval Annual* of 1897 is equal to any of its predecessors. The editor, the Hon. T. A. Brassey, remarks that the difficulty of preparing the volume during Lord Brassey's absence in Australia has been keenly felt, but to himself certainly the highest credit is due, for, whatever the difficulty may have been, happily the volume bears no evidence of it. It is particularly gratifying that Mr. Thursfield has been able to resume his charge of the naval manœuvres, and the editor has found new contributors, one of whom, Commander Ferber, of

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* *The Dickman Field Holder.* Hudson-Kimberly Publishing Company, Kansas City, Mo

† *Handbook for Light Artillery.* By A. B. Dyer, First Lieutenant, Fourth Artillery, U. S A. 12mo. Cloth, $3.00. New York: John Wiley & Sons. London: Chapman & Hall, Limited 1896.

‡ *The Naval Annual of 1897.* Edited by the Hon. T. A. Brassey. J. Griffin & Co., Portsmouth.

the Naval Academy at Kiel, has written a most interesting account of the German navy, which is of particular value at a time when the navy is so much under discussion. The illustrations, too, are increased in number. Very great care has been bestowed upon the permanent features of the volume, so that as a magazine of facts and statistics it is without a rival. Mr. Brassey himself gives a very admirable and complete *précis* of the naval progress of the year, no important fact being omitted. The same is done, as usual, for foreign navies, with perfect success, by M. Weyl. To the same class of permanent features belong the chapters on "Relative Strength," by the editor, and on "Naval Manœuvres," by Mr. Thursfield. Mr. Brassey, who deals exhaustively with his subject, throws out a doubt whether, in face of the rapid development of continental navies, the old standard of strength adopted is any longer sufficient. He himself is no longer content to confine his comparisons to the fleets of France and Russia, but wisely includes Germany and Italy as well. In regard to the first two States we venture to extract his classification. At the end of 1897, he tells us, there will probably be :—

	England.	France.	Russia.	France and Russia.
Battle-ships, 1st class	29	15	9	24
" 2d class	7	8	5	13
" 3d class	21	9	5	14
At the end of 1898 :—				
Battle-ships, 1st class	31	16	9	25
" 2d class	7	8	6	14
" 3d class	21	7	5	12
At the end of 1899 :—				
Battle-ships, 1st class	34	18	11	29
" 2d class	7	9	7	16
" 3d class	19	7	5	12

To Mr. Thursfield the thanks of all are due for his convincing exposition of the tactical and strategical lessons of the manœuvres. Our readers must peruse the wholly admirable chapter for themselves. The ambiguity of the instructions in regard to the date of despatching cruisers is censured, but it is pointed out that nothing in them would have prevented Lord Walter Kerr from stationing his cruisers at Queenstown instead of Berehaven, and from his not taking the advantage, the ill effect of precedent in the conduct of manœuvres is inferred. It is also suggested that Lord Walter Kerr would have been better advised to leave his anchorage immediately on the declaration of war. But we must forbear to attempt to give our readers any further idea of the highly suggestive treatment which the manœuvres receive at Mr. Thursfield's competent hands. We must be content also merely to refer to the other permanent features of the volume, the very full tables of British and foreign ships, for which commander C. N. Robinson and Mr. John Leyland are responsible; the ship plans, of which many are new (Mr. F. K. Barnes); the armor and ordnance section, under the care of Capt. Orde Browne, R. A.; and the section devoted to estimates of British and foreign navies. Upon these no pains have been spared. We turn, therefore, to chapters upon exceptional subjects. Mr. Brassey himself contributes a valuable account of the naval and military forces of Australia; an essay filled with Imperial patriotism on the principles of Imperial defense, being an address delivered at Melbourne before the Victorian Federation League; and a chapter on the manning of the navy in time of war, which embodies an excellent suggestion for the creation of

an Imperial naval reserve. Commander Ferber's account of the German navy and its administration is excellent. He is not satisfied with its material condition. Capt. Orde Browne's "Ships Under Fire," is a very thoughtful consideration of the attack and defense of ships, with particular illustrations. The broad fact deduced is the enormous advantage offered by common shell fire and the value of medium armor such as will defeat this. Sir George Clarke's chapter on "The Limitations of Passive Defense" strikes in trenchant fashion at the root of many strategic fallacies in regard to the use and influence of the fleet, and especially at the notion that naval warfare is a kind of hide and seek in which each adversary is free to do what he pleases until he is caught. Finally, Mr. G. R. Dunell contributes a valuable chapter on "Naval Engineering," and Mr. John Leyland a critical discussion of "Recent Naval Literature."

Prize Essay—1897.

I.—The following Resolution of Council is published for the information of all concerned:

Resolved, That a Prize of a Gold Medal, together with $100 and a Certificate of Life Membership, be offered annually by THE MILITARY SERVICE INSTITUTION OF THE UNITED STATES for the best essay on a military topic of current interest, the subject to be selected by the Executive Council, and $50 to the first honorably mentioned essay. The Prizes will be awarded under the following conditions:

1. Competition to be open to all persons eligible to membership.

2. Each competitor shall send three copies of his Essay in a sealed envelope to the Secretary *on or before September* 1, 1897. The Essay must be strictly anonymous, but the author shall adopt some *nom de plume* and sign the same to the Essay, followed by a figure corresponding with the number of pages of MS.; a sealed envelope bearing the *nom de plume* on the outside, and enclosing full name and address, should accompany the Essay. This envelope to be opened in the presence of the Council after the decision of the Board of Award has been received.

3. The prize shall be awarded upon the recommendation of a Board consisting of three suitable persons chosen by the Executive Council, who will be requested to designate *the Essay deemed worthy of the prize;* and also in their order of merit those deserving of honorable mention.

In determining the essay worthy of the prize, the Board will be requested to consider its professional excellence, usefulness and valuable originality, as of the first importance, and its literary merit as of the second importance. Should members of the Board determine that no essay is worthy of the prize, they may designate one or more essays simply as of honorable mention; in either case, they will be requested to designate one essay as first honorable mention. Should the Board deem proper, it may recommend neither prize nor honorable mention. Should it be so desired, the recommendation of individual members will be considered as confidential by the Council.

4. The successful Essay shall be published in the Journal of the Institution, and the Essays deemed worthy of honorable mention shall be read before the Institution, or published, at the discretion of the Council.

5. Essays must not exceed twenty thousand words, or fifty pages of the size and style of the JOURNAL (exclusive of tables).

II.—The Subject selected by the Council at a meeting held Sept. 11, 1896, for the Prize Essay of 1897, is

"BASED ON PRESENT CONDITIONS AND PAST EXPERIENCES, HOW SHOULD OUR VOLUNTEER ARMIES BE RAISED, ORGANIZED, TRAINED AND MOBILIZED FOR FUTURE WARS."

III.– The gentlemen chosen by the Council to constitute the Board of Awards for the year 1897 are:.

GENERAL WESLEY MERRITT,
GOVERNOR U. A. WOODBURY,
COLONEL H. W. CLOSSON.

GOVERNOR'S ISLAND,
Nov. 1, 1896.

JAMES FORNANCE,
Secretary.

Prize Essay of Infantry Society

FOR 1898.

"The Infantry of Our Regular Army; Its History, Possibilities and Necessities."

The conditions of the competition can be learned from the Secretary Infantry Society, Fort Leavenworth, Kansas.